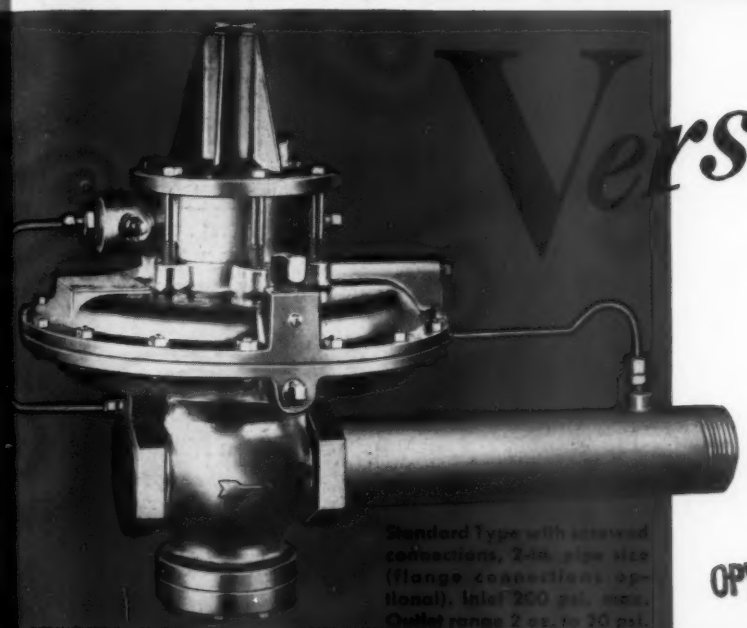
VOL. 180 No. 2 AMERICAN FEBRUARY, 1954

Gas Journal

CONGRESS
SERIAL RECORD
MAR 18 1954



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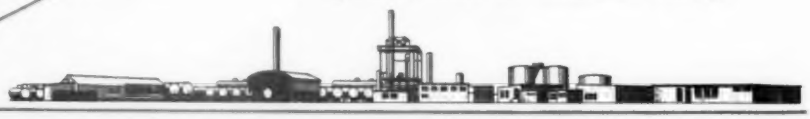

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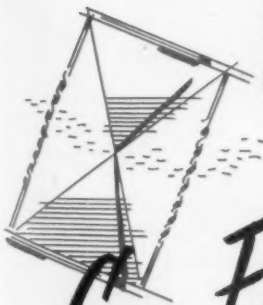

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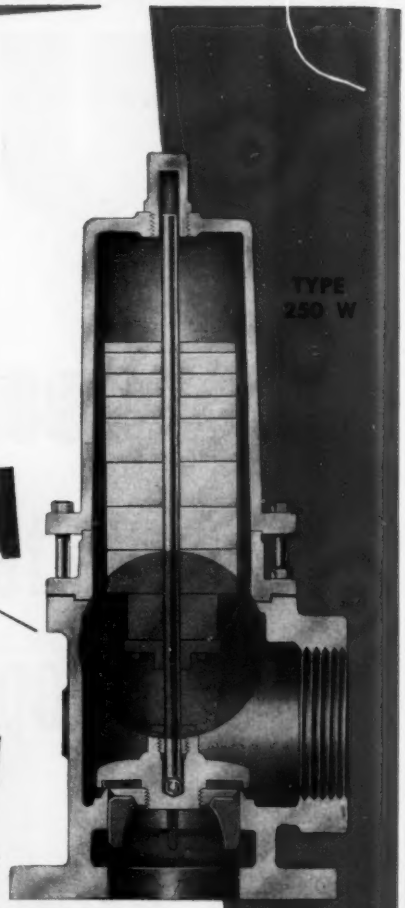
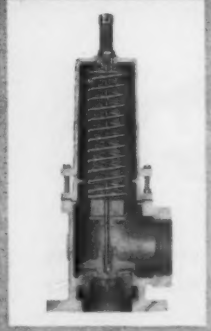
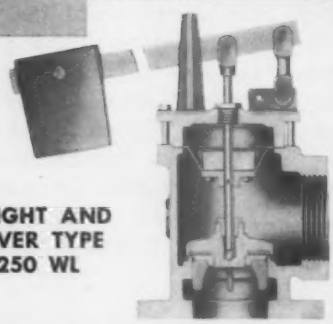
WHAT A DIFFERENCE A "D" MAKES in the NEW CHAPLIN-FULTON High Capacity *Safety Valves*



"D" stands for diaphragm, and what a difference it makes in the discharge ability of the new Chaplin-Fulton High Capacity Safety Valves—2½ times more flow capacity. After initial opening, the discharge pressure acting upward on the diaphragm insures maximum opening, and guarantees full flow with minimum increase in in the blowing pressure. This means greater protection for the users of Chaplin-Fulton Type 250 Safety Valves, adaptable in three models to all gas systems from ounces to 100 pounds. Sizes 2" to 6" inclusive.



SPRING TYPE
250 S



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AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 180 FEBRUARY 1954 NUMBER 2

This month...

The heavy dependence of modern industry upon research and development as the stepping stones of continuing advancement has been so thoroughly established that it needs no labored wordage here. We have viewed research and development within the gas industry, however, as having *especially* high current importance. The recent developments in domestic range equipment, by the American Gas Association Laboratories, hold particularly fine promise for new features with strong customer-attraction—the key to acceptance and buying action. The first of two articles presenting the AGA Lab developments starts on page 27; the second article will be in our March issue.

• • •

Support for a conclusion, arrived at independently and thoughtfully, is gratifying to most men; we are no exception. The annual February outlook by Edward R. Martin, director of marketing and statistics, Gas Appliance Manufacturers Association (page 46), recognizes fully the views of business economists who forecast a decline of about 5% in the gross national product. However, Mr. Martin gives particular attention to the portents for the gas industry as reflected in a mass of substantial and specific information reported to GAMA by appliance manufacturers—and, from the consensus, he looks with confidence toward a year-end with a cheerful sales results. For that opinion, expressed in our January issue, we have loud cheers. But—opportunity won't stand still, just waiting under some corner lamp post.

• • •

We, who now carry on with AMERICAN GAS JOURNAL, express our deepest appreciation to all the members of the gas industry who sent us their words of regret on learning that Elliott Taylor had passed away. During the first weeks, with lonesomeness heavy upon us, those words were helpful.

Contents

Editorial: Something Is Missing 13

Design and Operation of a Simple Pressure Alarm System —Carroll V. Kroeger 14

Refractory Materials for Gas-Fired Equipment Involve Variety of Selection-Considerations—Emil Blaha 16

Mechanics of Pipeline Cost Allocation—John J. Franks .. 18

Business Showing Constructive Attitude Toward 1954 Outlook—John F. Falvey 20

Facts on the Law of Representation Offered in Recent Decisions—Leo T. Parker 21

Federal Power Commission 22

American Gas Fundamentals: Glossary of Gas Industry Terms: Min to Pud 23

Newly Developed Principles of Domestic Range Equipment Presented to Industry—Hilding H. Carlson 27

News of the Gas Industry 32

Gas Industry Calendar 44

AMERICAN GAS MERCHANDISING..... 45

GAMA Sees Favorable 1954 Potential for Gas Appliance Sales 46

Brooklyn Union Launches Mrs. America Contest 46

Gas Appliance Industry News 52

Index to Advertisers 52

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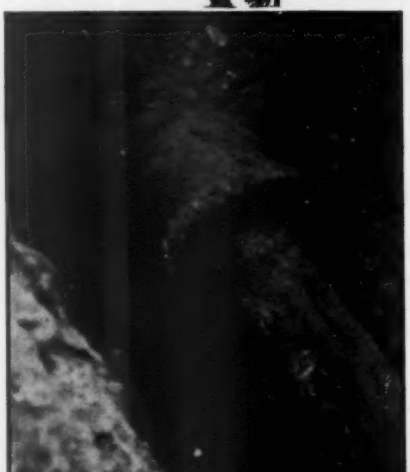

This cast iron gas main is in good condition after over 100 years of service in Providence, R. I.—one of more than 50 cities with century-old gas or water mains in service.

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pipe for Modern Gas Distribution

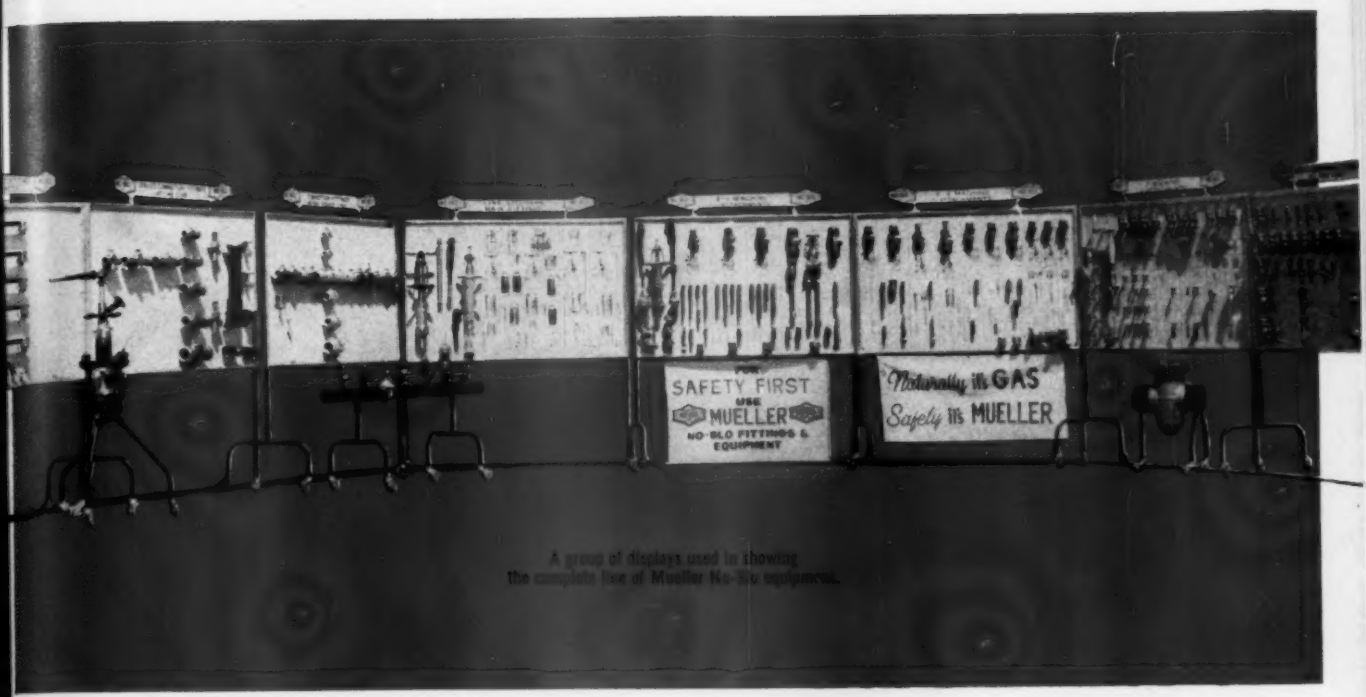
A group of Atlanta Gas Light Co. personnel — typical of the safety meetings held by Frank Miller and F. X. Uhl, Mueller Co. gas engineers.

Mueller Co. No-Blo Safety School travels 35,000 miles to show before 325 gas companies

To help train gas company personnel in making installations safely, under pressure, Mueller Co. started a safety school on a tour throughout the major portion of the United States in August of 1952. The prime purpose of this school was to assist gas companies in training their personnel to make gas service connections safely, under pressure, without loss of gas. By making extensive use of actual demonstrations, the step-by-step procedure for making safe gas connections was clearly explained.

The requirement for such a school had been indicated to Mueller Co. by the tremendous demand placed on gas

Frank Miller and F. X. Uhl, Mueller Co. gas engineers, with the Traveling No-Blo Demonstration Unit.



A group of displays used in showing the complete line of Mueller No-Blo equipment.

distribution systems in recent years. This increased demand has made it necessary to increase gas line pressure. Increased pressure requires the use of new and modern equipment and machines which permit gas companies to make connections safely, under pressure, without loss of gas and without disturbing existing services.

The Mueller No-Blo Safety School was on the road for a fifteen month period, from August, 1952, through October, 1953. Actual demonstrations were made to over 8,000 employees of 325 different gas companies. These companies have more than 13,000,000 gas services in the ground.

The initial tour has only recently been completed but the school is being held in readiness for further service.

As an additional service to the gas industry, Mueller Co. has, for the past year, been making extensive use of cartoon-style "how-to-do-it" ads, showing the step-by-step procedure for making gas connections safely. Mueller Co. will continue to make this type of information available to the industry.

The first series of these "how-to-do-it" ads has been compiled in booklet form. Write Dept. A-36 for your copy or copies of "How To Make Gas Connections Safely" today.

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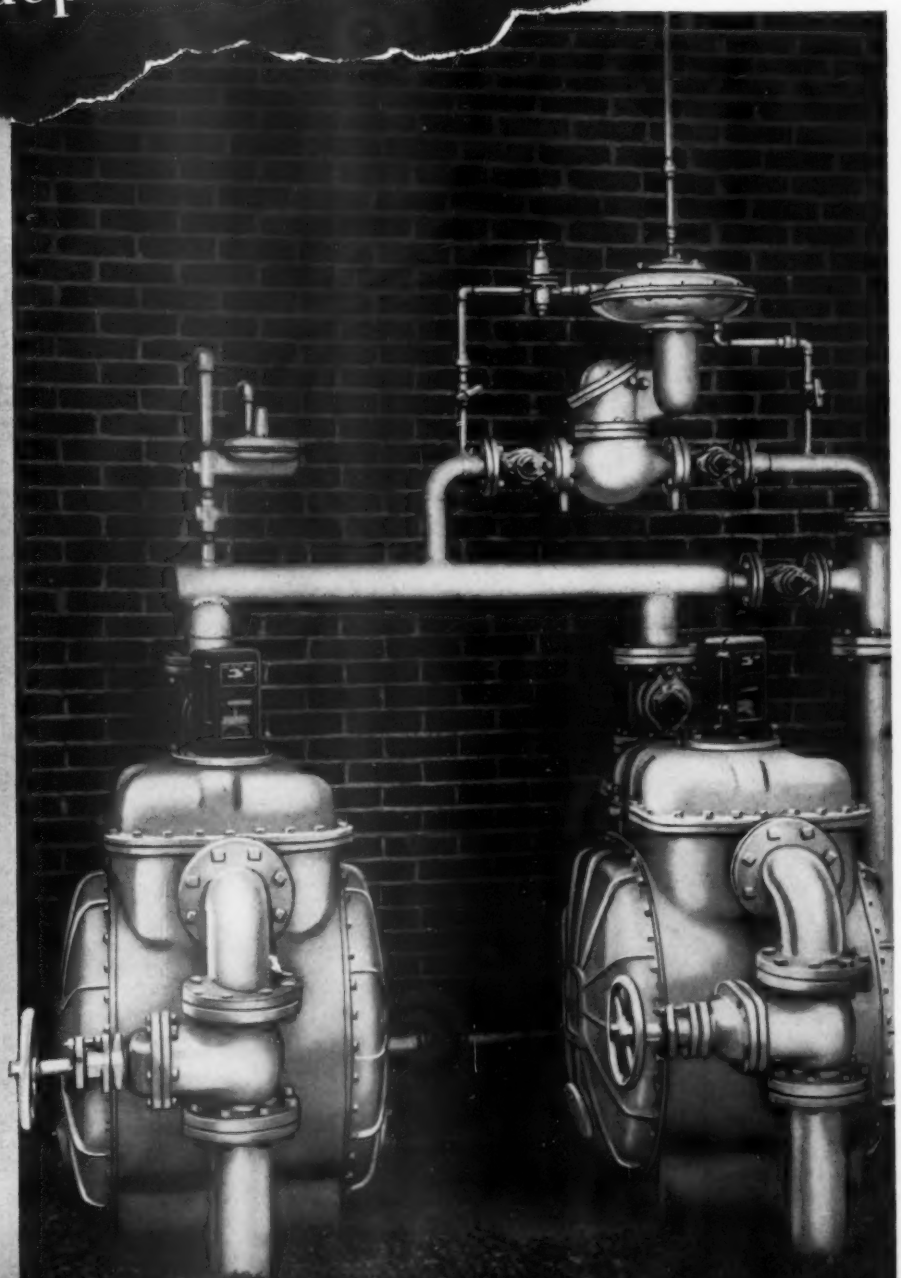

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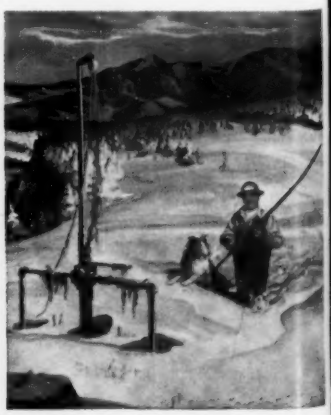
DRESSER MANUFACTURING DIVISION, Bradford, Pa. Oil and gas pipe couplings, fittings and sleeves—rolled and welded rings—welded fittings and flanges.



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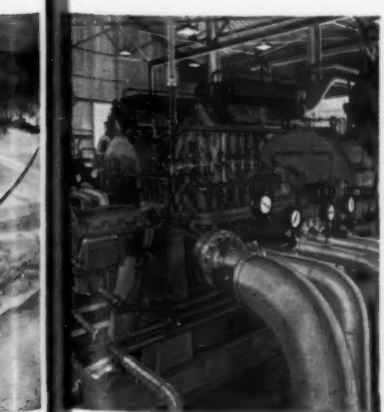
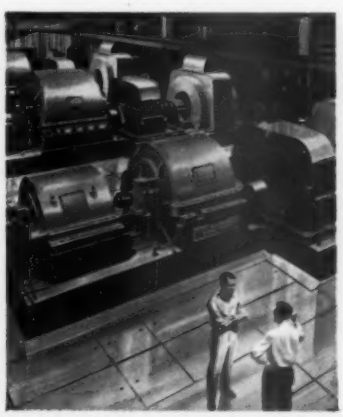


PACIFIC PUMPS, INC., Huntington Park, Calif. Centrifugal pumps, deep oilwell plunger pumps, hot oil and boiler feed pumps.



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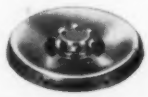

Click . . . a gentle "Keep Warm" heat . . . without further cooking.

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Editorial:

Something is Missing

At this point, there cannot possibly be a single executive in a gas utility or in a gas appliance manufacturing company who is not indelibly aware of the simple-but-serious fact that the gas industry is facing an unfavorable competitive sales picture.

The joint committees of American Gas Association and Gas Appliance Manufacturers Association went to work and then produced their recommended policies for gas industry development to meet those unfavorable comparisons. Their recommendations still have highly-significant industry endorsements. Those policies were presented to leaders of the utility and manufacturing groups in regional high-level discussions and convention presentations. But—something was missing.

Now, the 10-cities demonstration is under way, operating in the deep silences—and something is missing.

Gas industry development, in a full consideration, means advancing the entire gas industry by advancing the individual companies and the several categories of companies within the utility and manufacturer groups —in the pipeline and LP groups—in all the associations. It means, certainly, the large companies and the small companies; the companies that are, or think they are currently successful, and those that state their situations are deteriorated.

The Gas Industry Development Program is a collection of policies recommended for local company application. There is substantial agreement that there is no "program" in the Gas Industry Development Program. The very word implies specific A-B-C listing of activities, coupled with specific who-when-where-how —and that is missing.

No question about it—the application of these policies requires a program and a program needs preparation; that is the stated purpose of the 10-cities demonstration. Ultimately, maybe a year away, the results of that test can be translated into specific items of a program that may be assumed to result in a continuing development of the industry. In the meanwhile, there is a perilous gap of time; everything else is standing quite still. Plans to bridge that gap are missing.

One year, or six months, or one day, will permit for further competitive advances at the cost of heavy losses in the domestic loads that were previously regarded as reserved-for-gas.

We believe firmly that the gas industry is psychologically and intellectually capable of effecting a coordination of producers, pipelines, utilities, LP gas marketers and appliance manufacturers—*the gas industry*—for early, vigorous and effective action that will combat the onrushing electrical competition.

That coordination is truly a matter of concern for one and for all. In any realistic regard for long-term gas industry welfare, neither the relative closeness of the distributing utility to the ultimate consumer nor the relative remoteness of the producer are valid as the sole criteria for determining either the desirability or eligibility for support and participation.

In line with that thinking we were heartened to learn that a resolution, adopted this month by the AGA board of directors, solicits "active cooperation of all regional and state gas associations of the United States and Canada together with the Independent Natural Gas Association and the Gas Appliance Manufacturers Association in combined efforts to reach common objectives through the adoption of policies and programs of mutual interest; and . . . further . . . that the American Gas Association cooperate with these associations and their members in coordinated action. . . ."

That resolution might well become the keystone in an arch of gas industry solidarity that has never been built; possibly never before visualized.

That resolution can become the stimulus that will supply the still-missing element in gas industry development—*united action now*.

There is plenty of room for united action now—salesmanship . . . dealer relations and support . . . consumer advertising . . . sales promotion . . . vigorous public relations.

The coordinated action that will bridge the next 12 perilous months will require a cross-industry understanding of the hard facts in the situation . . . unselfishness by persons, companies and groups . . . a sincere acceptance of individual responsibilities by persons, companies and groups—for immediate and continuing action . . . unstinting and unselfish dollar-support . . . above all, executive dedication to the principle that gas industry development is an urgent consideration for every company, *not just a few*.

SURVIVAL is the well-considered objective of gas industry action NOW, more action later, but always—*action*.

Harold W. Carlson

Design and Operation of a Simple Pressure Alarm System

by Carroll V. Kroeger
Engineer
Central Indiana Gas Co.

IN recent years the adequate control of pressure has become very important because of the rapid growth of house-heating loads. Before distribution systems developed critical characteristics, supervisors did not have to concern themselves with the problem of maintaining strict pressure control, as long as the pressure regulation was in accordance with accepted practices. In the event of pressure decline due to regulator failure or other causes, the first indication would come from industrial or commercial customers in the form of complaints. This alert gave a sufficient amount of time in which to locate and correct the difficulty before domestic customers could experience low pressures.

However, since these same systems have taken on high heating saturations, the load characteristics have changed drastically. The grace period which previously existed is reduced so that it is no longer possible to rely on the methods which were satisfactory in the past. On the other hand, it is just as important to know when distribution pressures skyrocket due to improper operations.

In the initial design of such a system certain requirements must be met for satisfactory operation:

1. The system should be fully automatic.
2. It should have provision for changing the limits to meet operating requirements.
3. It should provide both visual and audio alarm.
4. It should be as trouble free as possible.

Some time ago concern was expressed in Central Indiana Gas Company as to the necessity of installing a pressure alarm system. Eventually, such a system was designed and installed at one of the company's divisions, and is now operating satisfactorily. Three basic pressures are under observation with this system, in conjunction with a temperature system which operates on the holder water temperatures at the standby plant. Transmission pressure is fed to the regulating and metering station from the city gate. It is then regulated down to (A) high pressure which is fed to the industrial belt, (B) intermediate pressure which is fed to the city belt, (C) and low pressure. The system is designed to alarm if:

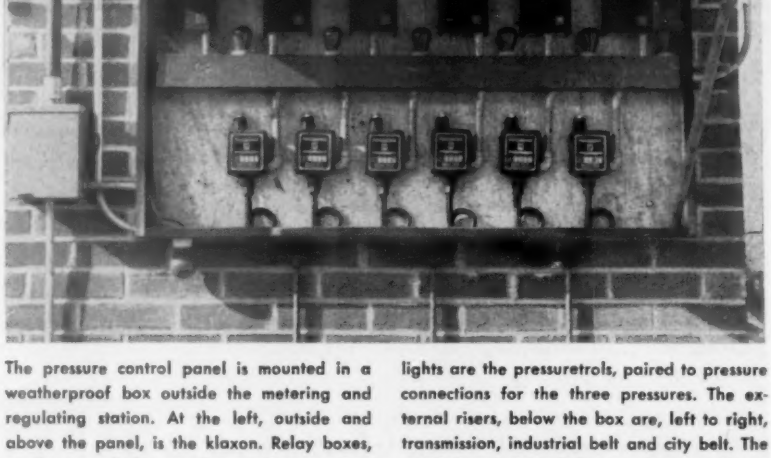
The transmission pressure passes the high or low limits.
The high pressure exceeds the high or low limits.
The intermediate pressure exceeds the high or low limits.
Electric power fails at the plant, or the emergency station.
There is a break in the interconnecting leased telephone cable.

Several limitations were imposed during the initial design stages of the system. It was considered necessary to design the system as simply as possible so that any electrician could effect quick repairs, yet have the system perform all of the desired functions. Electronic equipment is not readily available in some localities, and it was concluded that simple electrical equipment would be satisfactory.

The alarm system contains three basic electrical circuits:

1. 110 volt AC at the plant connecting the control devices to the switch-acting relays.
2. 40 volt DC connecting the alarm panel at the plant to the emergency station.
3. 10 volt AC at the emergency station to provide the alarm.

Since company personnel are not on duty at the standby plant 24 hours a day, it was necessary to make arrangements for the system to operate when the plant was not manned. An arrangement was made, to handle emergency alarms from 5:00 P.M. until 8:00 A.M. each day, whereby a leased telephone line connected the alarming devices at the plant to the emergency station. The alarm at the emergency station is audio only, and upon hearing it the station's attendant makes a series of telephone calls to alert company personnel. The emergency crew is then put into immediate action. The alarm panel at the plant is observed to determine the pressure system causing the alarm. The panel also indicates whether the pressure is high or low. A series of checks are made



The pressure control panel is mounted in a weatherproof box outside the metering and regulating station. At the left, outside and above the panel, is the klaxon. Relay boxes, at the top of the panel, are above and to the left of the six signal lights. Below the lights are the pressuretrols, paired to pressure connections for the three pressures. The external risers, below the box are, left to right, transmission, industrial belt and city belt. The switch box is left of the panel; external conduit, right, carries leased telephone line.

until the trouble is located and corrected. The emergency station is then contacted when the system is back within the desired range.

Pressuretrols with a range of 10 to 300 pounds are utilized as the control instruments. (See figure one) These contain spst mercury switches which break an electric circuit on pressure rise or decline, and which are each equipped with a knurled adjustment knob for adjustment of the pressure limits. Each pressuretrol is wired in series to a dpdt relay which breaks the circuit in the telephone line, and closes two additional circuits. One of these additional circuits energizes a signal light which indicates the system that is giving the pressure trouble, and shows visually whether this is high or low pressure. The other circuit sounds the plant Klaxon. All of these circuits are powered by 110 volt AC current. Each of the relays is wired in series with the telephone line so that any one of them may break the circuit to the emergency station to sound the alarm.

It was necessary to revise the wiring in the relays to obtain desired switching actions, (See figure three), since it was required all relays be able to close a circuit that would sound the plant Klaxon. However, each relay also had to energize a separate signal light to give a visual indication as to which system indicated a high or low pressure. This was accomplished by adding another pole to the relay (see number 9, figure three) and removing the common connection from pole number 8. This small change accomplished the desired switching actions.

All the control devices, relays and signal lights are mounted on a control panel that is installed in a weatherproof box mounted on the outside of the regulation and metering station. (See figure four and five.) It is obvious that it is not safe practice to install the panel inside the building, since some of the instruments are not of sparkproof construction. The pressure taps were made inside the building at the three systems to be controlled, with the pressure connections running underground to the control panel with standard ¼-inch pipe. 110 volt AC current is provided through a switch box to the control panel, and a ground is run from the switch box to a steel rod driven into the soil near the foundation of the building. All wiring in the control panel is enclosed in conduit for added protection.

The current carried by the leased telephone line is 40 volt DC, which was governed by a telephone company limitation of 45 volts DC to be carried on their lines. This 40 volt current is supplied by a rectifier which was installed at the emergency station. (figure two) A

(Continued on page 43)

WIRING DIAGRAMS FOR THE SIMPLE PRESSURE ALARM SYSTEM

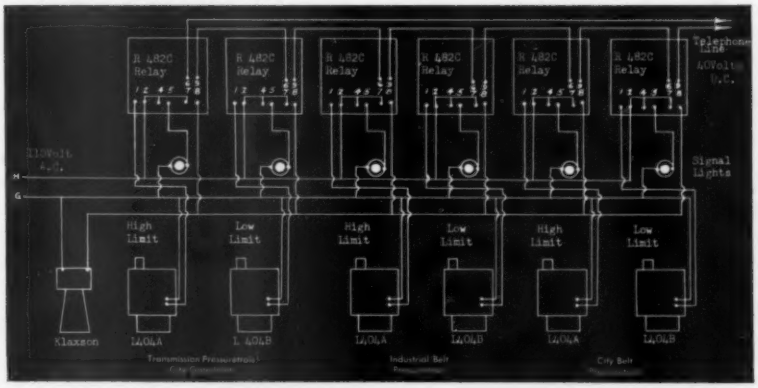


Figure 1
SCHEMATIC WIRING DIAGRAM—CONTROL PANEL

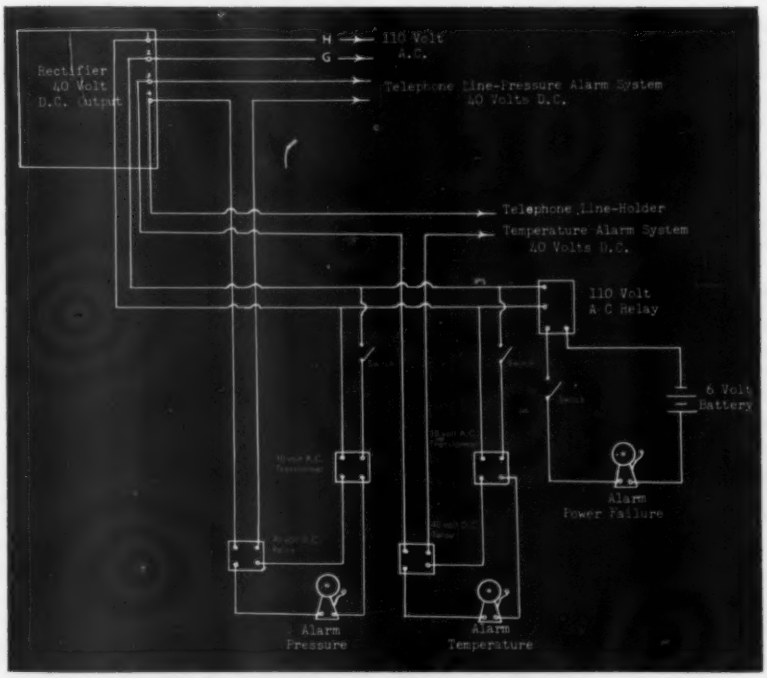


Figure 2
SCHEMATIC WIRING DIAGRAM—ALARM PANEL

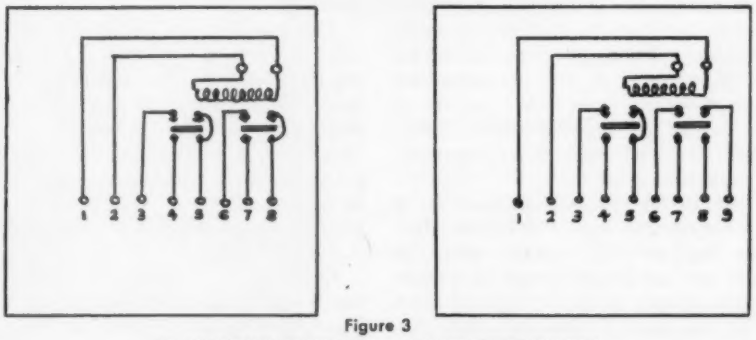


Figure 3
RELAY BEFORE REWIRING RELAY AFTER WIRING
Relay is Minneapolis Honeywell R482C. Connections:
1 and 2—110 volt AC current
4 and 5—Signal light circuit
6 and 9—Telephone circuit
7 and 8—Klaxon circuit

Refractory Materials for Gas-Fired Equipment

by Emil Blaha
Ceramic Engineer
Selas Corporation of America

THE use of gas fuel in industrial furnaces favors the materials employed to contain the heat so as to simplify their selection. For all heat requirements except those that are most unusual and extreme, a satisfactory furnace lining is assured if refractory characteristics of heat resistance, thermal expansion, thermal insulation, structure and strength are considered. With gas firing, certain harmful effects of less refined fuels may be entirely disregarded.

Ordinary refractories, as used today, have certain physical properties in common and these are as follows: crystalline structure, nonductility, low thermal conductivity, high compression strength and low strength in tension. These basic properties impose severe limitations with respect to thermally induced stresses, requiring very specific heat-up and cooling procedures as materials are forced toward extreme limits. To circumvent such limitations most conventional heating equipment is designed for relatively moderate operation.

For further accommodation to the physical properties of refractory materials, furnaces are designed as loose but "confined" structures. These structures are, by necessity, neither mechanically sound nor solid. Within such confined structures many refractory materials may be used, and there are available many grades of each material.

The most common and most abundant raw material is used in relatively large quantities to produce quartz (silica) bricks and blocks employed mostly in the steel and ceramic industries. The outstanding properties of quartz are high rigidity—almost up to its fusion point at about 3,000°F—thermal stability above 1,200°F, and low cost. The disadvantages are numerous, especially because gas fuel is capable of rapid heat release. There must be careful control during heat-up, due to a sudden phase inversion from alpha quartz to beta quartz at approximately 600°C (1,112°F), as shown in the accompanying illustration.

This inversion is accompanied by a large expansion and, therefore, furnaces lined with a quartz refractory should not be cycled across that temperature range. Both heating and cooling of the furnace must take the contraction or expansion, due to the quartz inversion, into consideration. Specific uses of silica bricks include high temperature ceramic industry furnace roofs, and linings for acid type steel mill furnaces.

By far the largest number of refractories used belong to the firebrick category and essentially consist of a fired clay, which is a hydrous aluminum silicate. Selection and blending, and mineral additions at times, are made to obtain a refractory composition. Brick produced from kaolin or other high purity clay meets most requirements for housing high temperature furnaces and is almost chemically neutral. This type of brick possesses high refractory properties (i.e., temperature resistance) and may also be given high thermal insulating properties by suitable preparation. This may be accomplished by firing the "clay" with a suitable portion of combustibles to final shape, or by using this prefired material in turn as porous aggregate in the formulation from which insulating refractories are molded. Lower temperature or "backing-up" insulating bricks are made by the same procedure but by using less pure or ordinary fire clay.

In producing any of the refractory brick or other shapes, there must be an initial heat treatment to bring about the physical and mineral changes required to obtain a final structure capable of performing under the conditions of use. Briefly, this consists of: heating the molded shape to remove chemically combined water, which is accompanied by breakdown of the clay mineral structure; and recombining of the elements by heating to a higher temperature to form a crystalline structure corresponding to the initial composition and thermal state reached. Under practical conditions of maufacture, however, the finished, fired product may consist of several mineral phases differing entirely from those present in the original material used.

There are no outstanding characteristics of regular firebricks, but depending on the raw materials used and structure developed during the initial heat treatment, they are successfully employed for a wide range of useful applications which include: walls, floors, arches, checkerwork and piers in heat treating furnaces, kilns, melters and boiler settings.

Refractories marketed under the name mullite, and various trade names, consist primarily of one mineral phase. Mullite is an aluminum silicate mineral of fibrous structure found in nature or produced synthetically. Many naturally occurring aluminum silicate minerals and clay can be converted to mullite by heating at high temperatures. The most abundant mineral that can be converted readily to mullite is kyanite, found in all parts of the world. This mineral, when heated to a high temperature, expands to form mullite, and refractory products incorporating fired kyanite possess certain physical properties inherent to it. The fusion point is above 3,000°F and like quartz, it retains its rigid structure up to the dissociating temperature. It has relatively low thermal expansion and conductivity. The field of application is most extensive wherever requirements are more severe than indicated for ordinary firebrick and where a chemically neutral material is desired. Typical applications include crucible furnace linings, burner tunnels and rammed shapes.

Zirconium silicate, as found in nature on the beaches of practically all oceans, is actually the semi-precious variety of zircon in the form of a fine sand. When formed into brick or other refractory shapes, the physical properties parallel those of mullite, and its present use results largely because high grade kyanite is uncertain in supply.

Wherever a relatively coarse structure is required it becomes necessary to produce a coarse aggregate in a separate operation since the commercially available material is in the form of fine-grained sand. Due to this additional operation, and also because of the high specific gravity of the material, its use in furnace lining is not extensive.

A large number of refractory materials have been and are being developed for special applications. In this group belong some old and some recently developed low thermal expansion refractories that are relatively insensitive to rapid heating and cooling, and which should be of interest to users of gaseous fuels since these developments will permit the realization of more complete utilization of the favorable characteristics of gas, particularly for high-speed heating.

Cordierite is an old standby that is used primarily for space heater requirements and miscellaneous burner parts. Basically, it is a three-component mineral, a magnesium aluminum silicate, obtained by compounding talc and clay in the proper proportions and firing the

...volve Variety of Selection-Considerations

molded articles to a predetermined temperature-time schedule. The resulting product has very low thermal expansion and can be temperature cycled rapidly without failure. Actually the only disadvantage of this material is its limited temperature range. The fusion point is approximately 2,550°F and therefore, a furnace lining of cordierite cannot be used safely in an uncontrolled gas-fired furnace, even if the temperature requirements are appreciably below the fusion temperature of the material. Either local overheating or general temperature overshooting would fuse such a lining.

Carbides are materials that approach the physical properties of metals with respect to strength and heat conductivity, and at the same time, unlike most metals, remain rigid at very high temperatures. Some are very resistant to oxidation, even at high temperature, and if we are to believe claims made for some of the newer combinations, they will provide the solution to many difficult heating problems. Most of these materials, except silicon carbide, are expensive at present and incorporation of these structural materials for high temperature furnace designs will demand and result from new concepts of heating procedure.

Most common of the carbide family is silicon carbide. Although somewhat more costly than most other common refractories, its high strength and density result in its use for furnace piers, in metal melting furnace linings to resist abrasion and in certain heavy duty burner nozzles. High thermal conductivity indicates its use for combustion tubes and furnace hearth tiles. Its one disadvantage, perhaps, is its tendency to grow under oxidizing conditions.

There is in service a chemically alkaline or basic material called magnesite, or periclase. This magnesium oxide refractory is used as a lining for basic type steel mill furnaces where acid or neutral linings would be quickly destroyed by chemical attack. Obviously basic and acid type linings cannot be built together, but must be separated by courses of neutral material.

Because they will not react with ferrous scale, chrome ores are used for hearths of forge furnaces and other high temperature steel working units. This material does not melt, but rather dissociates and it does not mix, dissolve or react readily with other oxides. Its thermal expansion is high, while its strength and conductivity are low.

In addition to the common refractories mentioned above, numerous products have been developed for specific applications, and these range from single oxides like alumina, to carbide-oxides, metal-carbide-oxides and metal-oxide combinations. These all have the common goals of insensitivity to heat cycling and resistance to very high temperatures.

Prefired standard and special shape bricks are widely used and permit construction of linings with uniform characteristics throughout. Bricks and standard shapes are generally available in both "hard" and insulating types. Together they account for the bulk of all industrial furnace linings.

Coarse aggregates of fire clay or mullite, plus varying percentages of calcium aluminate cement, make up castable materials. Convenient for irregularly shaped linings or for fabricating special shapes on short notice, they are rather widely used. Some thermal and structural properties are lost until they have been thoroughly fired, but after firing their somewhat higher thermal conductivity makes them advantageous for rapid cycling.

Ramming mixtures are of coarse grained fire clay with a minimum of raw plastic clay, the balance being fired aggregate. Somewhat less convenient to handle than castables, they are nevertheless well suited to packing burner tunnels and making small repairs on locations at otherwise inaccessible points.

Most cements are the same as the ramming mixtures described above except for texture. They are, necessarily, ground further so as to have fine grain. When an air setting composition is required, a quantity of sodium silicate (water glass) is added. Some cements are dry while others are water mixed.

On the market are several thinned-down cements for brushing or spraying onto refractory walls after completion. Although various claims are made for them, their value has not as yet been well established.

Refractory limitations

In spite of the fact that gas firing is the most advantageous for the selection of refractories, there are certain applications in which refractory materials must be considered expendable after short periods of operation, including:

a) Where molten glass or metallic oxides are inter-soluble with refractory materials.
b) Where temperature requirements are well in excess of 3,000°F.
c) Where economic and techno-

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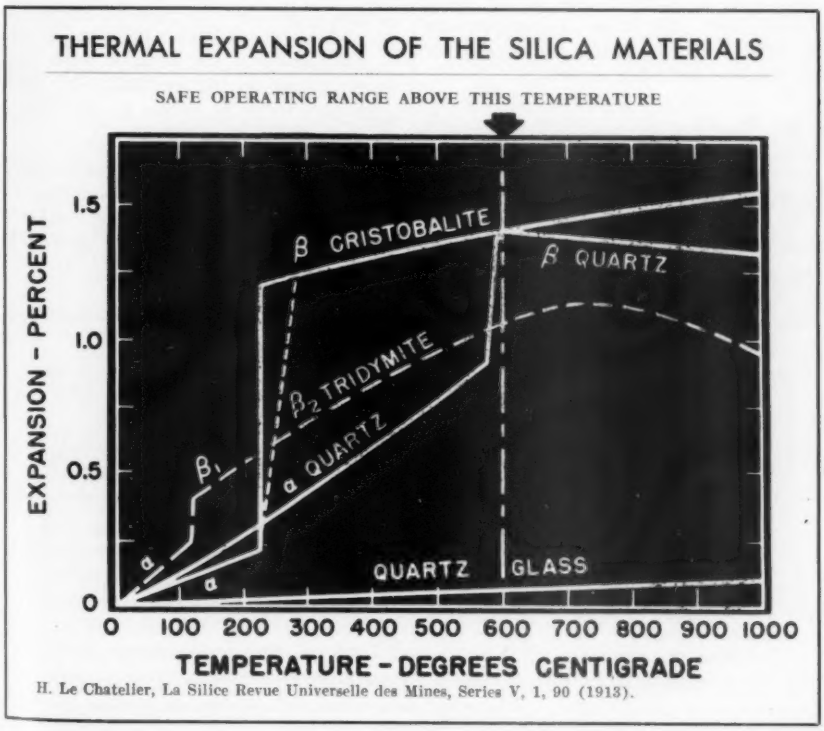


H. Le Chatelier, La Silice Revue Universelle des Mines, Series V, 1, 90 (1913).

Mechanics of Pipeline Cost Allocation

by John J. Franks
Systems Supervisor
Northern Natural Gas Company

EVER since the first days of gas pipeline transmission operations, the problem of how to establish fair and equitable rates for the various types of consumers has been a lively subject of discussion among utility people, consulting experts and governmental regulatory bodies. Because of the wide variances in individual problems and company histories, some of the theories propounded over the years have been miles apart in their details.

John J. Franks

Some of the ideas advanced, which may produce admittedly superior results, have been passed over because of their complexities or the laborious detail required in their preparation. In these instances the use of punched card equipment usually found in most of the gas and electric companies can be used to obtain data in a matter of hours which would require weeks of hand computation.

Recently our company had the opportunity to put the machines to a practical test; the steps and mechanics which reduced several weeks of work to several hours will be outlined here. The problem was posed by Hans E. Nissel who wished to apply his Capacity Credit Method (AMERICAN GAS JOURNAL, October-November, 1953) of allocating costs to classes of customers and on the basis of zones. The equipment used to obtain the required data consisted of an I.B.M. type 604 calculator, a collator, a sorter and a tabulator.

The particular problem herein covered may differ in detail from one company to another, but the principles used may be adapted to fit most circumstances.

Our problem: In broad terms there were two types of customers, jurisdictional and nonjurisdictional; three geographical locations, zone 1 closest to the source of supply, zone 2 in the center of the transmission system and zone 3 farthest from the source of supply.

The problem required the allocation of the capacity cost accruing in each of the three zones, to the six firm customer groups. Main line transmission cost in zone 1 had to be shared among all 6 classes; that in zone 2 among the 4 classes in zones 2 and 3; and cost in zone 3 between the two classes in zone 3 only.

Branch line transmission cost in each zone had to be borne by the two firm customer classes in that zone only, since customers in other zones are not responsible for such cost. Therefore, five sets of capacity responsibilities had to be established: three intrazone responsibilities and two interzone. For identification purposes, interzone capacity responsibilities of zone 2 and 3 customers, applicable to main line transmission cost in zone 2, were referred to as zone 4 responsibilities. Those of all 6 firm classes of customers which relate to main line transmission cost in zone 1, were called zone 5 responsibilities.

The capacity credit method used for the determination of capacity responsibilities recognizes the used-unused capacity principle. Used capacity means capacity needed at any time for satisfying the requirements of firm customers.

Unused capacity is idle capacity which, due to load fluctuations, is not needed during certain periods and may be used for interruptible customers. The computation technique described here deals with the allocation of unused capacity to the 6 firm classes of customers.

This allocation of unused capacity is based on a modification of the complete peak method. The complete peak is made up of the days during which the firm system demand is above average daily demand, computed on an annual basis. The complete peak for the whole system in the present case is 165 days, which forms the basis of computation for zone 5. The complete peak is slightly shorter for the other zones.

The capacity credit method first assigns unused capacity above and below system average to the days making up the complete peak and shares it subsequently on each of these days among firm customers, in proportion to the excess of their demand over their individual average. Firm customers using less than their average during the complete peak are given credit for capacity vacated by them. The offset of such credit is shared among the other firm customers, along with the unused capacity assigned to that day.

On this particular problem it was necessary to punch one tabulating card for each customer group, in each zone, for each day of the complete peak period —a total of 996 cards. Information punched (see sample card form) was as follows:

Date—(month and day) in columns 1-4
Zone—in column 5
Type—(jurisdictional: 1, or nonjurisdictional: 2) in column 6
Sales—(in Mcf) in columns 10-15

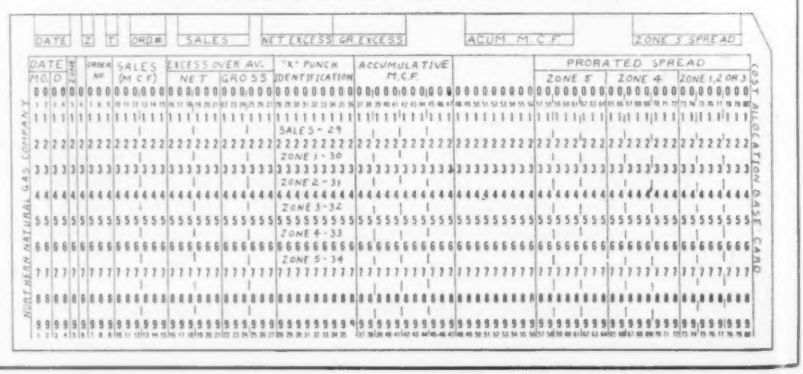
Following the accompanying machine flow chart, these operations produced the desired allocation base.

The cards were verified and proven on the tabulator after which they were processed through the 604 calculator with a group of average master cards (six cards, one for each customer group for each zone) to calculate and punch the plus or minus "excess over or under average" of the sales for that day. The "excess" was punched into columns 16-21.

All the cards for zone 1 were then summarized on the calculator by date, punching totals of excess by day into 2 fields in the card as follows:

1. Plus excess and minus excess from detail cards netted together and punched into the "net excess" field on the summary cards in columns 16-21.

ARRANGEMENT OF IBM PUNCH CARD



FLOW CHART OF COST ALLOCATION MECHANICS

2. Plus excess cards only (minus cards were ignored) added and total punched into the "gross excess" field on the summary cards in columns 22-27.

The same operation was performed for the zone 2 and zone 3 cards. We had then, 3 sets of zone summary cards. At this point we repeated the operation using the zone 2 and zone 3 summary cards to create an additional set which would be a total of excess for the two zones farthest from the source of supply. For convenience of identification we called these "zone 4" cards. The last summarization was a combination of the zone summary cards for zones 1, 2 and 3. This was a total set of all excesses for the entire system and we called these cards "zone 5" cards.

At this point we had created five sets of summary cards:

The first three sets for zones 1, 2 and 3 were to be used to prorate local expenses which were chargeable only to the customers in each particular zone.

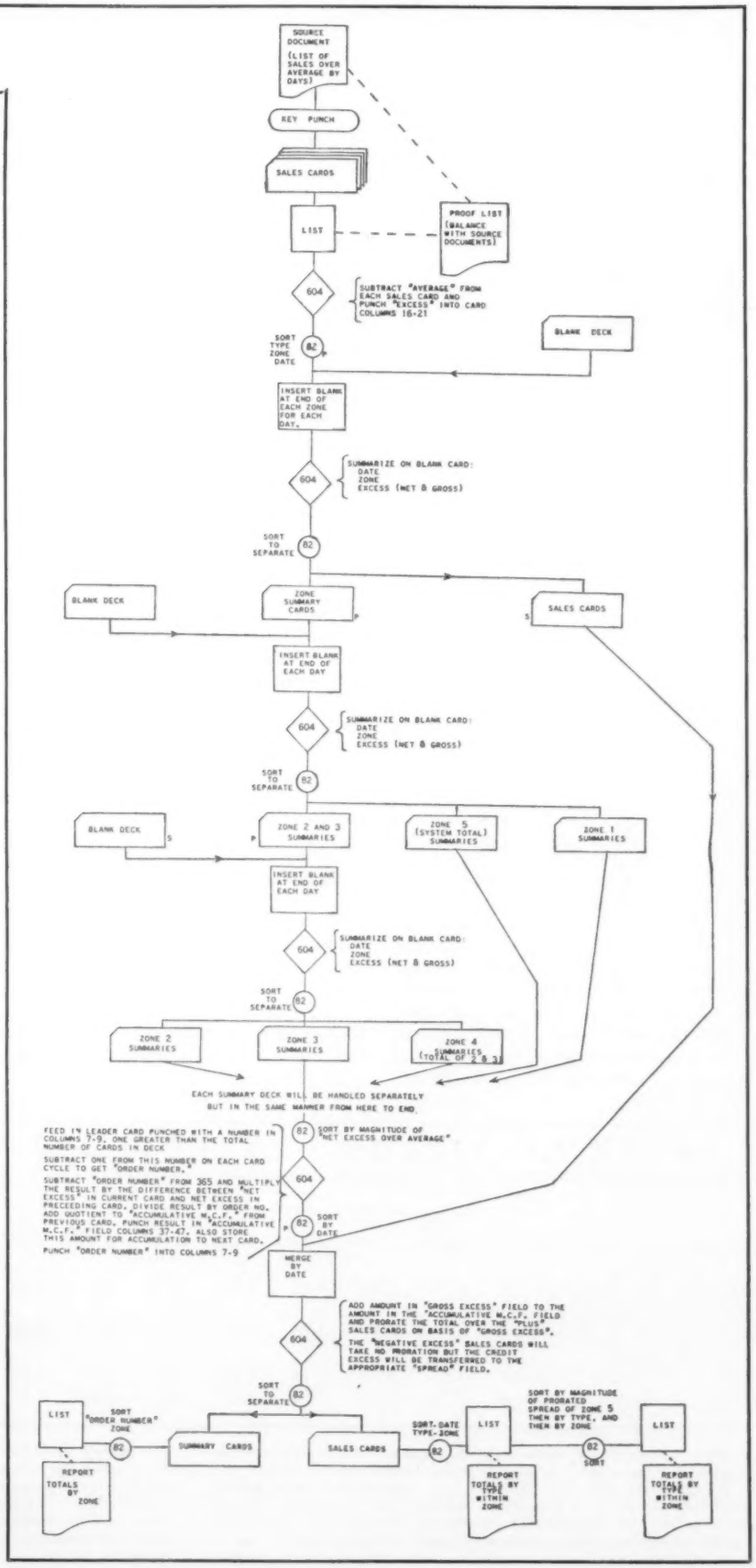
The "zone 4" set was to be used to prorate those expenses which occur beyond zone 1 on the system.

The "zone 5" set was to be used to prorate those expenses which are system wide in nature.

The next step was to calculate unused capacity which should be chargeable to each day on each of the above five sets of summary cards. First each deck was sorted by magnitude of "net excess over average" field columns 16-21. They were then processed through the 604 following a leader card which contained a number which was one greater than the total number of cards in the deck. In the calculation of each card several steps were taken:

1. The machine subtracts one from the above leader card and one on each succeeding card cycle and this number becomes "order number"—the highest day of the year will contain order number 1. The lowest above average day will receive the highest order number.
2. Subtract "order number" from 365 and multiply the *result* by the *difference* between "net excess over average" in the current card less the "net excess over average" from the preceding card.
3. The result of the calculation in 2, above, is divided by "order number," and the result added

(Continued on page 40)


SOURCE DOCUMENT (LIST OF SALES OVER AVERAGE BY DAYS)
KEY PUNCH
SALES CARDS
LIST
PROOF LIST (BALANCE WITH SOURCE DOCUMENTS)
604
SUBTRACT "AVERAGE" FROM EACH SALES CARD AND PUNCH "EXCESS" INTO CARD COLUMNS 16-21
BLANK DECK
SORT TYPE ZONE DATE
82
INSERT BLANK AT END OF EACH ZONE FOR EACH DAY.
SUMMARIZE ON BLANK CARD: DATE ZONE EXCESS (NET & GROSS)
SORT TO SEPARATE
ZONE SUMMARY CARDS
INSERT BLANK AT END OF EACH DAY
ZONE 2 AND 3 SUMMARIES
ZONE 5 (SYSTEM TOTAL) SUMMARIES
ZONE 1 SUMMARIES
ZONE 2 SUMMARIES
ZONE 3 SUMMARIES
ZONE 4 SUMMARIES (TOTAL OF 2 & 3)
EACH SUMMARY DECK WILL BE HANDLED SEPARATELY BUT IN THE SAME MANNER FROM HERE TO END.
FEED IN LEADER CARD PUNCHED WITH A NUMBER IN COLUMNS 7-9, ONE GREATER THAN THE TOTAL NUMBER OF CARDS IN DECK
SUBTRACT ONE FROM THIS NUMBER ON EACH CARD CYCLE TO GET "ORDER NUMBER."
SUBTRACT "ORDER NUMBER" FROM 365 AND MULTIPLY THE RESULT BY THE DIFFERENCE BETWEEN "NET EXCESS" IN CURRENT CARD AND NET EXCESS IN PRECEEDING CARD, DIVIDE RESULT BY ORDER NO. ADD QUOTIENT TO "ACCUMULATIVE M.C.F." FROM PREVIOUS CARD. PUNCH RESULT IN "ACCUMULATIVE M.C.F." FIELD COLUMNS 37-47. ALSO STORE THIS AMOUNT FOR ACCUMULATION TO NEXT CARD.
PUNCH "ORDER NUMBER" INTO COLUMNS 7-9
SORT BY MAGNITUDE OF "NET EXCESS OVER AVERAGE"
SORT BY DATE
MERGE BY DATE
ADD AMOUNT IN "GROSS EXCESS" FIELD TO THE AMOUNT IN THE "ACCUMULATIVE M.C.F." FIELD AND PRORATE THE TOTAL OVER THE "PLUS" SALES CARDS ON BASIS OF "GROSS EXCESS".
THE "NEGATIVE EXCESS" SALES CARDS WILL TAKE NO PRORATION BUT THE CREDIT EXCESS WILL BE TRANSFERRED TO THE APPROPRIATE "SPREAD" FIELD.
SORT "ORDER NUMBER" ZONE
SUMMARY CARDS
SALES CARDS
SORT DATE TYPE ZONE
SORT BY MAGNITUDE OF PRORATED SPREAD OF ZONE 5 THEN BY TYPE, AND THEN BY ZONE
REPORT TOTALS BY ZONE
REPORT TOTALS BY TYPE WITHIN ZONE
REPORT TOTALS BY TYPE WITHIN ZONE

Business Showing Constructive Attitude Toward 1954 Outlook

by John F. Falvey

Financial Editor

John F. Falvey

ALL segments of the corporate security list—bonds, preferred stocks and common shares—recently have been giving a better account of themselves, now that sober reflection on the economic outlook seems to indicate that readjustment may not be as severe as originally anticipated. In fact, at the moment it appears that business readjustment is proceeding somewhat more rapidly than had been expected, especially in the automobile industry.

Within the short space of the past four weeks average yields on all classes of bonds have been pared by 12 basis points, a sizable gain in so short a period. Proof of the improvement which has been taking place is shown in the ability of Michigan Consolidated Gas Company to market successfully to the public, on a 3.33% basis, $20,000,000 of first mortgage bonds for which it refused one lone bid on a 5% basis last June. This spelled a saving to the utility of about $6,500,000 over the 25-year life of the bond.

And at this writing fair market reception is being accorded the $6,000,000 issue of Mississippi Power & Light Company preferred stock on a 4.28% yield basis.

Just a bit of weakness is beginning to develop in the corporate bond market, now that the Treasury has placed itself on record to come along with a sizable refunding job in March for the purpose of extending the maturity dates of a substantial portion of its outstanding debt. The impending Government bond operation, plus an increasing volume of corporate debt offerings now in prospect, might reverse the recent improving trend, but such a development promises to be only temporary.

Business is showing its constructive attitude toward the outlook by scheduling, in 1954 new construction, only about 4% below the $28 billion recorded in 1953. Assayal of all available portents suggests that furtherance of the drop in business—which in the latest six months aggregated only about 5 or 6%—will be restricted to moderate proportions and will fall in varying degrees on different phases of the economy.

Some industries are expected to do well while others experience a let-down; personal income and consumer spending should stay at a comparatively high level; and only minor decline is anticipated from present levels in gross national product and employment. In sum, industrial activity is expected to remain at a high rate, although not at capacity, and a comparatively good year, all things considered, is envisioned for business in 1954.

Careful study of the outlook for companies whose common stocks comprise one of the better known stock indices suggests that industrial company net earnings for all of 1954 will dip no more than 2% below the high level of 1953, dividends per share on these stocks will show practically no change, and the total of earnings retained for use in the business will fall but about 4% below 1953.

In the improvement which it has shown during recent months the bond market has been aided considerably by the record-shattering $15 billion of new savings which were channeled into the commercial banks, insurance companies and savings and loan associations during 1953. Contrary to the opinion held in some financial quarters, the volume of earnings is not likely to dwindle to any appreciable extent this year. To date the recession which has occurred in business has tended merely to arrest the rise in disposable income of individuals in the amount of personal savings after living costs. Unless the trend of business this year is lower than is now anticipated, no more than a moderate decline is looked for in the flow of savings into the coffers of the financial institutions.

Recent active bidding for new corporate issues by financial institutions reflects the prospect both of a continuing heavy flow of savings and a possible subsequent shortage of suitable investments due to lower corporate financing needs later in the year.

This self-same factor may induce heavy institutional subscription for the new long-term securities which the Treasury is preparing to bring to market.

Developments underlying in part the recent improvement in common stock prices are the 11% reduction which already has taken place in personal in-

(Continued on page 41)

INDEX OF YIELDS : SELECTED UTILITIES STOCKS

	Jan. 1954	Dec. 1953	Nov. 1953	Oct. 1953	Sept. 1953	Aug. 1953	July 1953	June 1953	May 1953	Apr. 1953	Mar. 1953	Feb. 1953
Natural Gas Transmission Companies	4.21%	4.39%	4.44%	4.44%	4.90%	4.46%	4.76%	4.72%	4.34%	4.18%	4.04%	3.95%
Natural Gas Transmission & Distribution Companies	5.39	5.54	5.49	5.58	5.74	5.13	5.41	5.55	5.28	5.06	4.91	4.91
Manufactured & Mixed Gas Companies	4.66	4.91	4.75	4.94	5.14	4.99	5.06	5.08	4.80	4.73	4.63	4.65
Class "A" Electric Companies	4.92	5.10	5.15	5.14	5.41	5.27	5.41	5.53	5.18	5.14	4.97	5.05
Class "B" Electric Companies	5.14	5.23	5.14	5.37	5.61	5.50	5.41	5.68	5.35	5.06	4.93	5.08

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

This index is compiled from: natural gas transmission companies, 5; natural gas transmission and distribution companies, 5; manufactured and mixed gas companies, 4; class "A" electric companies, 4; class "B" electric companies, 5.

Facts On the Law of Representation Offered in Recent Decisions

by Leo T. Parker
Attorney at Law
Cincinnati, Ohio

LEGAL representation is an important subject of law and a knowledge of it may assist in the avoidance of expensive law suits. It is important to know that legal representation involves contracts made by salesmen, ordinary employees, regional managers, and company officials. If there is no legal representation then there is no valid or enforceable contract.

Legal representation may arise under circumstances where an employer authorized his employee to act as his legal agent; or where past conduct of an employer would indicate to any reasonable person that an employee was authorized to represent him.

Ratification of contract

Although an unauthorized employee may make a contract, the parties to the contract may ratify it and make it a valid agreement. If the contract is one of sale and a seller ships merchandise which the buyer accepts, there is a valid contract.

In Art Company v. Pacific States Cast Iron Pipe Company, 176 Pac. (2d) 962, testimony showed: An office manager, named Webb, of the Los Angeles branch of Pacific States Cast Iron Pipe Company, a seller, made a written contract with a gas company, a buyer, to sell the latter a certain quantity of pipe. This contract contained the clause: All orders submitted to us, through our division sales offices, sales agents, or direct to the general office by the buyer, must be subject to the approval of the vice president, treasurer, or general sales manager of our company for final acceptance.

The buyer accepted delivery of the pipe, paid the agreed contract price, and later filed suit for damages, alleging that some of the pipe was either defective or damaged.

The seller argued that the contract was void as it had been executed by Mr. Webb and the agreement contained the clause that the contract, to be binding, must be approved by the home office. In refusing to hold the contract void, the court said:

"This proposition is untenable for the reason that all the material specified in the contract was shipped by defendant (seller), accepted and paid for by plaintiffs (purchaser) at the price, and on the terms, specified in the contract; thus defendant (seller) had fully ratified the contract by performance entered into by its local agent."

In other words, although the original contract contained a clause to the effect that, to be binding, the contract must be approved by an official of the seller, yet in disregard of this clause the seller had shipped the merchandise to the purchaser who accepted the shipment. Thus, both the buyer and seller ratified the otherwise unenforceable contract.

Unusual authority

When confronted with the problem of whether an employee has authority to bind his employer, the court will refer to the general rules by which the authority of agents is controlled. One rule seeks to protect employers against the wrongful assumptions by others of the authority of employees and agents. To accomplish this purpose the courts give special weight to the doctrine that an employer has the right to extend or restrict the powers of his agent, as his judgments dictate. The other rule seeks to protect the public against losses due to the appearance of power in an agent and emphasizes that, where one of two persons, both free from a fraudulent motive, must suffer loss in consequence of the act of one of them, he whose innocent act entailed the loss must bear it. This latter principle lies at the root of most of the court decisions concerning the apparent authority of agents.

A perplexity in many cases is to know whether failure of the third party to inquire, as far as prudence demanded, concerning the agent's authority, brought about a situation from which loss must occur; or whether the situation was due to the agent's employer having unwittingly lent to his agent the semblance of right to do the act. It is by no means easy to decide whether or not the alleged authority for a given act was conferred, either by design or inadvertence.

In a leading case (90 S. W. 742) the court explained the liability of a manufacturer for the acts of his salesman. This court said:

"One ground of liability on the part of a principal may be found in the following rule recognized by the law books: Where a man has placed an agent in such a position that a person of ordinary prudence, conversant with the usages of business and the nature of the particular business, is led to believe the agent has a certain authority and, without negligence deals with him on the assumption, the principal is estopped to repudiate the agent's act of agreement."

This situation may arise where the employer of a salesman, for example, supplies the salesman with a letter or contract containing information that the salesman has authority to enter into binding contracts. Another situation, having the same legal effect, is where in the past the salesman's employer customarily accepted and approved all contracts made by the salesman and shipped the merchandise without acknowledging the orders.

Within scope of employment

Generally, an employer, such as a gas company, is bound by all of the acts his salesman performs while acting within the scope of employment. Yet the courts have consistently held that a salesman's ordinary authority is simply to solicit orders and send them to his employer for ratification.

On the other hand, it is important to know that where a buyer places an order with a salesman who had no authority to make a valid contract of sale, and the employer of the salesman fails to promptly notify the purchaser that the salesman exceeded his authority, the seller is liable on the contract, because by remaining silent and permitting the purchaser to believe that the merchandise ordered would be delivered, the salesman's employer legally ratifies the contract of sale.

Cannot assume representation

Another important point of law is that a gas company selling appliances and other merchandise cannot expect to receive payment for merchandise purchased on "assumed" representation which arises from the belief that anyone is justified in taking the law into his own hands.

In Serio v. Macheca, 25 So. (2d) 364, it was shown that a man named Serio purchased an apartment building subject to an agreement by the seller that he would install in the apartments, gas stoves, kitchen cabinets and Venetian blinds.

The seller did not install these items and the buyer personally purchased the items from a local gas company. Then suit was filed against the seller of the apartment building, to recover the value of the stoves and cabinets.

The seller defended the suit on the

(Continued on page 38)

FEDERAL POWER COMMISSION

Northern Natural Rate Increase Settlement Approved

The Commission has approved a settlement providing for a $6,006,000 annual increase in wholesale natural gas rates by Northern Natural Gas Co., instead of a $13,193,000 increase originally requested, based on revised annual estimated sales of 234,588,200 Mcf. The new rates will be effective as of December 27, 1953.

The Commission computed a net investment rate base of $226,197,315 for the year 1954, and—allowing a 6 percent rate of return—developed a total cost of service of $91,979,330, of which $73,625,545 was allocated to jurisdictional sales. This cost of service estimate was submitted to all parties and an agreement was reached that rates which would yield revenues of $73,083,254 from interstate sales for resale would be acceptable to all parties.

Northern agreed that the rates to be filed pursuant to the settlement will be continued in effect for at least one year, to December 27, 1954, unless by proper order the cost of gas purchased by Northern or its subsidiaries is increased. If purchased gas costs are so increased, Northern may file a proposed offsetting increase in rates.

The settlement also is conditioned to require that Northern must refund the difference and file new rate schedules to reflect the changes; if the average effective Federal income tax rate payable in 1954 is less than the 52% which was used in computing Northern's cost of service; and if the Texas Gathering Tax, now the subject of litigation, is held to be invalid. The settlement also provides that if subsequent actions by any regulatory agencies result in refunds to Northern or its subsidiaries on amounts paid to gas suppliers, the money must be distributed to Northern's customers in proportion to the amounts of gas purchased.

Deny TGT Request to Shorten Rate Increase Suspension Period

The Commission has denied a request by Tennessee Gas Transmission Co. to shorten the suspension period of a proposed $6,510,000 annual wholesale natural gas rate increase so that the new rates could be made effective, subject to refund, as of January 12 instead of March 1, 1954.

Tennessee claimed that, effective January 1, it would incur an annual increase of about $3,600,000 in the price of gas under contracts with producers. The company also said that its annual labor cost and related employee welfare and pension expenses were to go up by approximately $2,000,000 the first of this year. In support of its request, Tennessee pointed to the FPC's recent action in the granting of a shortened suspension period to Colorado Interstate Gas Co.

The Commission declared, however, that in considering Colorado's request it had information showing that during the months of January and February of this year Colorado would sustain operating losses under the rates in effect during those months. The FPC said that the impact of the increased field price of gas which Colorado would sustain was so great as in all likelihood to create an operating deficit for the 2 months.

Natural of America and United Increases Okay Subject to Refund

The Commission has issued orders making effective two proposed wholesale natural gas rate increases by United Gas Pipe Line Co. and one by Natural Gas Pipeline Co. of America, subject to the filing by the companies of written undertakings to assure the refund of any excess charges.

The orders require the companies to refund, together with interest at the rate of 6% per year, any amounts which the Commission disallows upon conclusion of the proceedings. The companies also must keep accurate accounts of all amounts collected by reason of the increases, and report the same monthly for each billing period.

Approve Proposed Settlement of United Fuel Rate Case

The Commission has approved a proposed settlement of a rate case which will allow United Fuel Gas Co. to retain an additional $1,048,000 per year of revenues from the wholesale natural gas rates which the company has been collecting under bond since last February 15, over the rates previously allowed by FPC. The new rates allow a 6¼% rate of return.

On November 19 the Commission issued an order prescribing rates for United Fuel which would increase its revenues by about $1,340,000 annually, based on the year ended June 30, 1952, over those allowed in a decision issued last August 7. At the request of United Fuel, the Commission subsequently stayed its November 19 order and reopened the record to receive additional evidence with regard to operations for the year 1953 and the 12 months ending February 28, 1954.

The Commission pointed out that United Fuel has another proposed rate increase pending which may be put into effect as of March 1, 1954. Consequently, the problem involved in the settlement is the rates to be charged during the period from February 15, 1953, through February 28, 1954.

On the basis of a field examination of United Fuel and a review of estimates furnished by the company, FPC computed a cost of service—applicable to interstate wholesale sales for the 12 months ending February 28, 1954—of $61,708,642. The estimated revenues prescribed in the November 19 order would have totaled $60,678,000, leaving a deficiency of $1,030,642, the Commission pointed out.

United Fuel has agreed to refund to its customers the difference between the rates made effective by the settlement and those which have been collected under bond since last February 15. All parties to the proceeding had agreed to the proposed settlement.

American Gas Fundamentals OUTLINE

NATURAL GAS
- *Geology
- *Drilling and completion
- *Methods of estimating reserves
- *Chemicals from gas
- *Natural gas conservation
- *Underground storage of natural gas

MANUFACTURED GASES
- *Coke oven gas; producer gas, blue gas; carbureted water gas
- *Reformed gas
- *Hi-Btu oil gas
- Interchangeability

LIQUEFIED PETROLEUM GASES
- *Sources, properties and uses

BASIC GAS LAWS
- *Perfect gases
- Supercompressibility

TRANSMISSION
- *Pipe lines
- *Corrosion and pipe protection
- *Compressor stations
- *Gas conditioning
- Flow formulae
- *Principles of orifice measurement
- Pipe coatings and protection methods

GAS STORAGE
- *Methods of storing gas

GAS DISTRIBUTION
- *System design and operation
- *Pressure regulation, part 1
- *Pressure regulation, part 2
- *Leak detection and control
- *Metering
- Measurement and accounting
- *Odorization
- Customer service

GAS UTILIZATION
- *Principles of gas combustion
- *Competitive fuels, part 1
- *Competitive fuels, part 2
- Domestic
- Commercial
- Industrial
- *Principles of absorption refrigeration

CONVERSION PRACTICES

MANAGEMENT PROBLEMS AND POLICIES
- *Corporate structure
- *Public utility regulation
- *Public relations
- Theories of rate making
- *Functions of the Land Department
- *Communications in the gas industry
- Personnel Management

GLOSSARY
- *Ab-to-Met

***Indicates chapters published since January 1, 1951; available without charge to new subscribers to American Gas Journal.**

How to Use the Material

American Gas Fundamentals *is a comprehensive compilation of basic gas facts to guide any gas utility employee toward a broader understanding of the industry as a whole.*

The series is designed to be removed from each current issue of AMERICAN GAS JOURNAL *and filed in a ring binder where it may be accumulated into a text book of permanent usefulness. Material should be filed under the major subject head appearing in the upper right hand box at the head of each chapter.*

Glossary of Gas Industry Terms: Min to Pud

M—CONTINUED

MINERAL MATTER Substances found in a natural state and composed of inorganic compounds and elements.

MINERAL WOOL Fibrous material, produced by mixing stone and blast furnace slag and blowing steam through it, used as thermal insulation.

MINIMUM FIRING RATE Lowest rate of fuel input at which operation of a burner or process can be sustained.

MIXED GAS Fuel gas in which natural gas or liquefied petroleum gas is mixed with maufactured gas to obtain a resulting gas with the same or higher Btu value than in the manufactured gas alone.

MIXING CHAMBER OR TUBE Space in which primary air and gas are mixed in combustible proportions ahead of the burner port or tip.

MODULATING CONTROL Control system in which the controlled medium, such as fuel to a furnace, can vary smoothly over the control range to maintain the desired condition, such as furnace temperature. This is as opposed to a two-position control, such as an on-off fuel control.

MOLAR GAS CONSTANT R in the general gas law, $PV = nRT$, equivalent to 74.73 foot-pounds.

MOLECULE Smallest possible division of a chemical compound which retains the physical and chemical properties of the compound.

MOTOR- OR SOLENOID-OPERATED Term applied to mechanical motion, such as in a valve or switch, activated by an electric motor or electro-magnet.

MOUTHPIECE Cast iron frame and door on the end of a coal gas retort through which coal is charged and coke removed.

MUFFLE FURNACE Materials-processing furnace containing a chamber of heat-resistant materials called a muffle, around which hot flue gases flow, heating the muffle and the materials being processed without exposing those materials directly to the flue gases.

MULTIPLE DECK OVENS Commercial kitchen oven consisting of several shallow sections stacked vertically, with either individual control or with a single control for the stack.

MULTIPLE LIFT OR SECTION GAS HOLDER (See Water sealed gas holder.)

MULTIPLE WASHER Gas washer effecting multiple contact between gas and washing fluid by means of baffles and ducts.

MULTISTAGE COMPRESSOR Compressor in which the gas being compressed passes in series through two or more compression cylinders.

N

NAPHTHA Light, colorless-to-pale yellow liquid, distilled from petroleum and having a specific gravity of 0.631 to 0.660+.

NAPHTHALENE White solid hydrocarbon ($C_{10}H_8$) obtained from coal distillation.

NATURAL CONVECTION Transfer of heat by movement of a fluid resulting from the density differences in differing temperatures from one point of the fluid to another.

NATURAL DRAFT Pressure differential across a combustion chamber caused by hot gases rising in a chimney or stack, thereby creating a partial vacuum in the chamber and drawing combustion air into the chamber.

NATURAL GAS Combustible gaseous hydrocarbons occurring naturally in the earth's formations and formed in past geologic ages.

NATURAL GAS LIQUIDS Liquid hydrocarbon mixtures recovered by condensation and absorption from natural gas after it has been produced from the underground formations; includes natural gasoline, condensate and liquified petroleum gases.

NATURAL GAS LIQUIDS RESERVES Volume of natural gas liquids in the natural underground formations. The proved recoverable natural gas liquids reserves is the volume of natural gas liquids, obtainable by presently used methods, from the proved recoverable natural gas reserves.

NATURAL GASOLINE Pentane and heavier hydrocarbon mixtures recovered or extracted from natural gas as it is produced from the underground formations.

NATURAL GAS RESERVES Volume of hydrocarbon gas existing in the natural formations of a specified area, which may be a field or pool. Proved recoverable gas reserve is the volume of gas that can be obtained from a particular area under specified physical conditions and with current operating procedures.

NATURAL OIL (See Petroleum.)

NEEDLE BEARING A bearing consisting of rollers pointed at both ends like needles and contained in a shell fitting around the outside of the rollers.

NEEDLE VALVE A small valve which is opened and closed, to permit or restrict fluid flow, by the movement of a pointed plug or needle in a tapered orifice in the valve body.

NEOPRENE Heat-resistant synthetic rubber that does not deteriorate on continued exposure to petroleum hydrocarbons.

NET CALORIC VALUE (See Lower heating value.)

NET HEATING VALUE (See Lower heating value.)

NEUTRAL ATMOSPHERE Gas content of a metal-treating furnace in which the metal is not to be oxidized or

deoxidized. In general, a gaseous environment which does not react chemically with materials which it contacts.

NEUTRAL FLAME Flame in which complete combustion takes place so that the flame is neither reducing nor oxidizing.

NEUTRAL OILS Trade name for oils distilled from petroleum without "cracking." Heavier than paraffin oils but will not emulsify in contact with water as do paraffin oils.

NEUTRON Atomic nuclear particle having the weight of a proton but possessing no electrical charge.

NIPPLE Tubular pipe fitting, usually threaded at both ends and less than one foot in length. Also a length of pipe considerably shorter than a standard joint.

NITROGEN An element (N) normally gaseous. It is odorless, colorless and chemically will not support combustion and is generally inert. Composes 79 per cent of earth's atmosphere in the free state.

NONANE Ninth member of the saturated or paraffin series of hydrocarbons (C_9H_{20}); boiling point 301°F.

NON-ASSOCIATED NATURAL GAS Free natural gas in the reservoir; gas that is not in contact with nor dissolved in crude oil in the reservoir.

NON-COMBUSTIBLE Substance or gas that will not combine with oxygen in the generation of heat.

NON-CONDENSABLE GAS Refinery gases which do not condense to a liquid while passing through a condenser under the normal operating conditions.

NON-FERROUS METAL Metal other than iron or any mixture of metals not containing iron.

NORMAL PRESSURE Unless otherwise designated, it is atmospheric pressure at sea level: 14.7 pounds per square inch or 760 millimeters of mercury column.

NORMAL THREAD ENGAGEMENT Length of overlap in a tight, threaded pipe connection.

NOZZLE MIXING BURNER Burner device in which the fuel and air are kept separate until discharged from the burner into the combustion chamber; flashback does not usually occur in this type of burner.

NUCLEOUS Heavy central core of an atom.

O

OAKUM Shredded hemp fibers used to caulk or fill joints such as in bell and spigot pipe; oakum may be dry or saturated with tar or oil.

OCTANE Eighth member of the paraffin series of hydrocarbons (C_8H_{18}). Liquid at normal temperatures and pressures; boiling point 258°F.

OCTANE NUMBER An arbitrary scale used to designate numerically the knock-characteristics of a motor gasoline; represents the percentage of iso-octane in a reference fuel giving equal performance with the fuel being rated, using a standard procedure.

ODORANT Substance giving a readily-perceptible odor at low concentrations in the material into which it is mixed and used as a warning sign of the presence of the material, such as natural gas.

OFF-PEAK The period during a day, week, month or year when the load being delivered by a gas system is not at or near the maximum volume delivered by that system.

OFFSET SWIVEL A pipe fitting that can be rotated in attaching a gas meter to gas piping for correction of misalignments in the piping.

OIL ASPHALT Heavy, black residuum remaining from the distillation of crude petroleum.

OIL ATOMIZATION Spraying oil through a nozzle so that it is broken up into a mist or fine droplets.

OIL BURNER Combustion device that is designed and constructed so that it automatically mixes air and fuel oil in the proper proportions for burning.

OIL CRACKING (See Cracking.)

OIL FOGGING Spraying a fine mist of oil into a gas stream of a distribution system to avoid the usually drying effects of gas in certain distribution and utilization equipment.

OIL GAS Gas produced by cracking a vaporized oil and fixing the vapors into a permanent gas at ordinary temperatures and pressures.

OIL REFINERY Processing plant in which crude petroleum is subjected to various chemical and physical treatments, such as cracking, reforming, sweetening and distillation, to produce a number of relatively pure mixtures, such as gasoline, kerosene, fuel oils, lubricating oils and greases.

OIL REFORMING Step in producing carbureted water gas in which a fraction of the carburetion oil is cracked to useful gas in the water gas generator.

OIL SCRUBBING The removal of certain impurities from manufactured gas by passing the gas through an oil spray or bubbling the gas through an oil bath.

OIL SPRAY A nozzle through which oil is forced to emerge as a fine mist.

OIL VAPOR Vaporized or atomized oil.

ON-OFF CONTROL Device which maintains the controlled media at desired points by turning the input on or off, but which does not modulate or proportion the input flow.

OPEN TOP RANGE Cooking stove on which the cooking containers are supported by open grills so that the burner flame impinges directly on the bottoms of the containers.

OPTIMUM AIR SUPPLY Volume of air delivered to a burner which will produce the maximum thermal efficiency under specific operating conditions.

ORGANIC SULPHUR Sulphur in compounds, other than hydrogen sulphide, which are found in manufactured gas.

ORIFICE Relatively small hole, generally round, in a plate, pipe or hollow body, designed to permit the controlled flow of a fluid.

ORIFICE METER Meter for measuring flow of fluid through a pipe or duct by measurement of the pressure differential across a plate having a precisely-cut hole in its center.

ORSAT ANALYZER Apparatus used to measure the quantitative amounts of carbon dioxide (CO_2), oxygen (O) and carbon monoxide (CO) in a gas.

OUTPUT Quantity or volume of production or delivery in a given time interval.

OVER-ALL BOILER EFFICIENCY Ratio of useful heat in the steam produced to the gross heat content of the fuel fed to the boiler.

OVERLOAD Any load on a machine or system which is in excess of its rated capacity.

OXIDE Chemical combination of an element or material with oxygen.

OXIDE ACTIVITY Indication of effectiveness of an iron oxide purifying material in removing hydrogen sulphide from gas.

OXIDIZING ATMOSPHERE Gases in a metallurgical furnace which cause scale or oxidize the metal being heat treated.

P

PACKING Material used to seal a joint, such as in bell and spigot pipe, or to seal a gland through which a rotating shaft passes.

PANEL HEATER Heating unit mounted on or flush with a wall surface.

PANEL HEATING Transmission of heat by both convection and radiation from panel surfaces to surrounding air.

PARAFFIN White waxy, odorless, tasteless substance obtained from petroleum and other oils.

PARAFFIN BASE Designation of crude oil composed largely of paraffin series of hydrocarbons.

PARAFFIN SERIES OF HYDROCARBONS Hydrocarbons having all the carbon valence bonds taken up with hydrogen and having straight or branched chain molecular structure; characterized by "ane" ending of name, such as methane, ethane, propane and butane.

PASCAL'S LAW A pressure exerted on a confined liquid is transmitted in all directions throughout the liquid.

PAVING BREAKER Pneumatically-operated hammer with a heavy chisel point used to break street paving or concrete.

PAY OR PAY SAND The part of a gas- or oil-bearing strata from which production can be obtained in commercial volumes.

PEAK OR PEAK LOAD The maximum consumer-demand for gas on a system during a specified interval; hour, day, week, month or year.

PEAK SHAVING Supplying gas to a system from an auxiliary source, during periods of maximum demand, to reduce the load or demand on the primary source of supply.

PEAT The earliest stage in the formation of coal; soft brown coal.

PENTANE Fifth member of the paraffin or saturated hydrocarbon series (C_5H_{12}). Boiling point, 97° F.

PER CENT AIR Percentage of the theoretical air required for complete combustion that is actually supplied to the combustion chamber.

PER CENT EXCESS AIR Volume of air supplied for combustion over and above that needed for complete combustion, expressed as a per cent.

PERFECT COMBUSTION Supplying fuel and air to a combustion chamber in such proportions that both the fuel and oxygen are totally consumed.

PERFECT GAS Any gas which conforms to Boyle's Law under wide variation of conditions, such as a gas in which the product of the absolute pressure, P, times the specific volume, v, divided by the absolute temperature, T, equals a constant, R. $\frac{Pv}{T} = R$

PERMEABILITY Ability of a substance, such as rock or shale, to allow the passage of fluids through pores or voids.

PETROLEUM A natural oil, composed primarily of hydrocarbons, existing in the earth's crust and produced by drilling wells into the deposits or extracting from oil bearing shales at or near the earth's surface.

PETROLEUM ASPHALT Asphalt obtained from refining of petroleum; used widely in highway construction.

PETROLEUM COKE Solid, carbonaceous residue of petroleum distillation.

$_pH$ NUMBER A numerical designation of the degree of alkalinity of acidity of a substance. A $_pH$ number of 7 denotes neutrality, numbers greater than 7 denote increasing alkalinity, numbers decreasing from 7 denote increasing acidity.

PHOTOCELL FLAME DETECTOR A device in which the light of a flame, shining on a photoelectric cell, generates an electric current which may activate such protective equipment as alarm systems, fuel shut-off valves, sprinkler or CO_2 fire systems.

PIG Cleaning device which is sent through a pipeline to scrape and brush foreign deposits, rust and dirt from the inside surface of the pipe; also called a go-devil.

PILOT LIGHT OR FLAME Constantly-burning small flame which ignites a large burner or burner system as gas enters.

PIPE BURNER Pipe, with a line of holes drilled along length, which acts as a mixing chamber for the primary air and gas before the mixture passes through the holes for combustion.

PIPE COATING Covering that is often an asphaltic preservative with an outer wrapping that is put on iron or steel pipe to protect it and prevent corrosion.

PIPE COVERING Insulating jackets placed around piping to prevent the transfer of heat or cold into or out of the pipe.

PIPE, IRON SIZE Pipe conforming to iron pipe standards but made of other material.

PIPELESS FURNACE Type of house-heating warm air furnace in which heated air comes through a grating directly into a central room instead of being piped to individual rooms by ducts.

PIPELINE Continuous pipe conduit, complete with such equipment as pumping or compressor stations, tanks, communication system and valves, for transporting fluids from one point to another, usually from the source of supply to points of utilization.

PIPELINER An employee of a pipeline company or a pipeline construction company.

PIPELINE WALKER An employee who walks along a pipeline checking its condition for leaks or breaks; now largely obsolete, with the work being done primarily from airplanes.

PISTON Reciprocating plug or block fitting within the cylinder of a reciprocating engine, compressor or pump. Also, the movable section of a waterless gas holder.

PIT HOLDER Water-sealed gas holder having its water tank below ground.

PITCH Heavy, sticky, black mixture of hydrocarbons.

PITOT TUBE Two small, contiguous tubes that can be inserted into a pipe carrying fluids to measure the flow of fluid in the pipe. The tubes are so arranged that one is affected by the flowing pressure of the fluid and the other by the static pressure existing in the pipe. The outside ends of the tubes are connected to either side of a manometer tube and the difference in pressure so measured is related directly to the rate of fluid flow in the pipe.

PITTING Formation of small depressions in a surface due to sand blasting, mechanical gouging, acid etching or corrosion.

GLOSSARY

PLANT General term for the land, buildings, machinery and equipment engaged in a manufacturing operation.

PLENUM CHAMBER Gas or air chamber under pressure and connected with one or more distributing ducts.

PLUG Sealing a hole in a vessel, such as a pipe or tank, by inserting material in the hole and then securing it by forcing or threading it in. Also, refers to the material used to plug the hole. Threaded pipe fitting which is screwed into the open end of a coupling to seal the end of a pipe also is called a plug.

PLUG COCK (See Lubricated plug cock.)

PNEUMATIC TOOLS Tools that are compressed air-operated, such as drills, hammers, tampers and chippers.

POISE Metric measurement of absolute viscosity equal to one dyne second per square centimeter, or one gram per centimeter second.

POROSITY Usually expressed as a percentage, the voids in oil- or gas-bearing rocks and shales.

PORT Opening in the seat of a slide valve in diaphragm gas meters, or an opening in any equipment for the flow of gases or vapors.

PORTED MANIFOLD TYPE BURNER Burner in which the fuel-air mixture burns at a number of small openings such as in domestic gas range burners.

POSITIVE DISPLACEMENT PUMP Pump which delivers a constant volume of fluid per cycle of operation at whatever pressure is necessary within the design limits of the mechanism of the pump.

POTENTIAL ENERGY Available but unreleased or unused energy.

POUND PER SQUARE INCH Unit of pressure equivalent to one pound of weight distributed evenly throughout, but contained entirely within one square inch of horizontal surface.

POUR POINT Temperature at which a liquid, such as oil, ceases to flow.

POWDERED FUEL BURNER Burner which utilizes mechanically-fed pulverized solid fuel.

POWER Rate of application of force.

PRECIPITATOR Mechanical, electrostatic, or chemical device to remove fine ash, tars, dusts or smoke particles from flue gases or other gaseous streams.

PREHEAT Advance heating, such as heating the combustion air of a furnace before it reaches the burner.

PREMIX BURNER Burner in which fuel and primary air are mixed before reaching the nozzle, or a burner to which is fed a mixture of fuel and air.

PREMIXER Mechanical device for mixing fuel and air in the proper proportions for combustion before feeding into a burner or burner system.

PREPARATION PERIOD Preliminary heating period in water gas production in which the fuel bed is heated to incandescence.

PREPAYMENT METER Coin-operated gas meter from which a specific volume of gas is supplied as required after a coin of the designated value has been deposited.

PRESSURE CONTROL Manual or automatic maintenance of pressure, in all or part of a system, at a predetermined level, or within a selected range.

PRESSURE DIFFERENTIAL Difference in pressure between any two points in a continuous system. Also, called pressure drop.

PRESSURE GAUGE Instrument for measuring the pressure of a fluid.

PRESSURE HOLDER High-pressure storage tank for a compressible fluid.

PRESSURE LOADER Device in which the rate of gas flow controls the operation of a pressure governor.

PRESSURE LOSS Lowering of pressure in equipment or piping system.

PRESSURE REGULATOR Device which maintains a constant pressure in a fluid flow line, less than its inlet pressure, regardless of the rate of flow in the line.

PRESSURE SURVEY An investigation of gas pressures in various parts of a distribution system to insure that the pressure is adequate in all parts of the system for proper gas service.

PREVENTIVE MAINTENANCE Routine maintenance, repair and replacement of worn or defective parts in a plant before failure in service to prevent operating shut-downs.

PRIMARY AIR Air which is mixed with fuel for required combustion characteristics before it is fed to the combustion chamber.

PRIMARY CONDENSER First condenser through which a gas or vapor passes for cooking or removal of impurities.

PRIMING Foaming and frothing of the water in a boiler; also the filling of pumps and adjacent lines with fluid before starting the pumps to insure development of suction.

PRODUCER AND PRODUCER GAS Machinery and equipment for burning or combustion of coal or coke with an insufficient supply of air to form producer gas which consists largely of carbon monoxide.

PRODUCTION PERIOD Period in water gas production in which steam is blown over the incandescent fuel bed to produce water or blue gas.

PRODUCTS OF COMBUSTION Flue gases, ash and vaporized liquids resulting from the burning of a fuel and air.

PROPANE Gaseous member of the paraffin series of hydrocarbons (C_3H_8), which when liquefied under pressure, is one of the components of liquefied petroleum (LP) gas.

PROPORTIONAL CONTROL Control system in which the value of the controlled variable maintains a continuous linear relationship to the setting of the controlling medium.

PROPORTIONING Maintaining the selected ratio between fuel and air in the flow to combustion equipment.

PROVE AND PROVER Prover is a device for measuring the accuracy of a gas meter as a basis for adjusting to the desired accuracy limits.

PSI Abbreviation for pounds per square inch.

PSIG Abbreviation for pounds per square inch gauge.

PSYCHROMETER Instrument for measuring atmospheric humidity.

PUDDLING Adding water to a material and working it into a mud consistency to compact the material.

The Glossary of Gas Industry Terms, of which this is the sixth installment, is being compiled by Robert M. Poe.

Newly Developed Principles of Domestic Range Equipment Presented to Industry

by Hilding H. Carlson

NEW principles of design, construction and operation for gas range equipment were demonstrated to executives and other representatives of utility and appliance-manufacturing companies, at the Cleveland Laboratories of American Gas Association last month, in the hope that there will be early adoptions of those principles in commercial production of domestic ranges.

Top burners, pilots, valves, an indirect oven and a radiant-flame broiler were features of the demonstrations that were presented by Walter B. Kirk, chief research engineer of AGA's Laboratories.

Walter B. Kirk

The demonstrations, sponsored jointly by the PAR committee and the Gas Industry Development committee, were a new approach to the problems involved in advancing and promoting gas appliance features that may have consumer-attractions.

A speed-up in the production of improved gas appliances was urged by the principal speakers during the 3-day demonstration period. The coordination of research and development with the objectives of the Gas Industry Development Program was stressed.

J. Theodore Wolfe

J. Theodore Wolfe, chairman of the development committee and executive vice-president, Consolidated Gas Electric Light & Power Company of Baltimore, together with Earl H. Eacker, AGA president, and president, Boston Consolidated Gas Company, urged the entire gas industry to support the efforts of all concerned—the Laboratories, individual utilities and appliance manufacturers—efforts to improve the overall competitive sales position of gas and gas appliances.

Purpose of project

The purpose of this PAR-sponsored project was to discover improvements now possible in gas ranges and to reduce the time lag between the discovery of these improvements and their appearance on the market.

THE FIRST OF TWO ARTICLES ON THE DEMONSTRATIONS OF NEW DOMESTIC GAS RANGE EQUIPMENT AT THE LABORATORIES OF AMERICAN GAS ASSOCIATION

The second article will be included in the March issue.

In meeting this objective, working models of desirable features have been and are being developed for demonstration to utility company representatives and to gas industry manufacturers. The project aims for the attainment of some of the goals of the Gas Industry Development Program.

The improved features shown in the first working models, aimed at making gas ranges better than competitive equipment, include:

1. Cool, if not absolutely cold ranges for cooler kitchens,
2. Instantaneous ignition or re-ignition of top burners at any input rate,
3. Unsurpassed heating speeds plus high efficiency,
4. Greater cleanability,
5. Precision control of the 1,000 heats possible with gas top burners plus very low turndown heats,
6. Fast, large area, golden-glow broiler,
7. Positive elimination of explosion hazards in a precision controlled oven are being offered for your critical examination and appraisal.

Little attention was given in the demonstration units to styling, materials of construction, or patent rights. These three factors must normally be investigated by the manufacturer along with cost of production. Some features are new, some old but utilized to better advantage. All equipment presented complies with applicable AGA Approval Requirements.

The models do not represent the only way to achieve the desired features, including improved performance. There is no intent nor desire on the part of AGA to limit the ingenuity of manufacturers, but rather to stimulate interest, thinking, and action in making available at reasonable cost a higher quality of convenient gas cooking service.

Top burners

A demonstration range top section had two regular size burners rated at 9,000 Btu per hour input each and a giant burner rated at 12,000 Btu. A fourth burner can be used as a regular burner rated at 9,000 Btu per hour input, or it may be used as an efficiency burner at 6,000 Btu.

Another experimental single-duty burner had the following features:

1. Broad span of precision-controlled heats with good efficiency,

(Continued on page 30)

Earl H. Eacker (left), with Edwin L. Hall, director, AGA Laboratories, discussing one of new burners during recent demonstrations.

Patricia A. Speidel, research staff, AGA Laboratories, demonstrates the comparison of the size of the new top burner with a nickel.

THIS CAN BE YOU In Your

$5,000 Worth of Rockwell-built DELTA Power Tools In Prizes!

ESSAY CONTEST

Write a paper not exceeding 2,000 words in length on the subject:

"The Economics of a Planned Meter Retirement Program"

Here is a topic gas company executives, accountants, engineers, distribution and repair shop men can all write about. Contestants can cite actual instances (with supporting figures) to document their entries or give their own arguments with regard to meter repair and retirement practices. Logic and clear thinking will count equally as well as past meter repair experience.

Contestants will, at the discretion of the Editor, be offered a $25.00 cash release fee for the use of their papers in the Rockwell publication—the Flow Line.

JINGLE CONTEST

COMPLETE THE LAST LINE OF THIS JINGLE

Programmed meter replacement, if it's not neglected
Will keep you and your customers fully protected.
Repairing worn meters can frequently be
A false and expensive economy.
Planned scrapping of "antiques," smart meter men say

This contest is easy—anyone in the gas business can enter and win. Just study the tips on meter repair practices listed on this page. Then write a clever, informative last line for the jingle. As an example, the last line could read:

"Will solve accuracy problems, the logical way."

Enter Either or Both of

2 BIG CONTESTS

Conducted At The Same Time By

ROCKWELL MANUFACTURING COMPANY

To Stimulate Thinking About

GAS METER REPAIR PRACTICES

CONTEST RULES AND REGULATIONS

Only those employed by gas utilities or those associated with gas utilities as consultants (such as engineering, tax, accounting, or operating consultants) are eligible to participate.

Contestants must live in either the United States or Canada.

All entries must be accompanied by coupon clipped from any contest announcement. Only one coupon is required to identify a contestant who submits a number of entries at the same time. Entries must be personally written by the contestant whose name appears on coupon.

Write on one side of paper only. DO NOT put name and address on any entry.

An executed coupon will serve as contestant's identification.

Contests close April 30, 1954. Entries must be postmarked on or before that date.

All entries will be impartially judged by a panel of informed gas utility authorities. Names will be announced later.

Judging will be completed as soon as possible after closing date and winners' names will be published in the trade press.

The decision by the judges will be final. All entries become the property of the sponsor and none will be returned.

In the case of ties duplicate prizes will be awarded.

TIPS ABOUT GAS METERS AND METER REPAIR PRACTICES

Ancient meters, like old automobiles, were not designed to be repaired forever.

Many meters 40 years old or older are still in service. They may have been repaired several times—sometimes completely rebuilt.

The cost in parts and labor for rebuilding a worn out meter can frequently exceed the cost of a new meter.

Because of mechanical deficiencies a repaired "ancient" will not stay accurate for as long a period as a new meter.

The cost of replacing an old meter that becomes a "D.R." in service can approximate that of a new one.

Meter repair shops that maintain accurate cost records can prove the economy of scrapping meters that have outlived their usefulness.

Complete DELTA Home Workshop

FIRST PRIZE IN THE ESSAY CONTEST—the finest set of industrial quality power tools available. With this completely equipped DELTA work shop you can do everything in woodworking from building your own home to setting up a professional cabinet shop. Here's what your winning entry in the essay contest will bring you: (1) A 10" Tilting Arbor Unisaw, (2) A 6" Jointer with Steel Stand, (3) A 14" Drill Press, (4) A 14" Band Saw, (5) A 7" Bench Type Tool Grinder, (6) A 12" Wood Turning Lathe, (7) A Variable Speed 24" Scroll Saw. Each tool is furnished with motor, switch and accessories which will enable you to do many "extra" jobs.

A TOTAL VALUE OF $1,750.64

COMPLETE PRIZE LIST

ESSAY CONTEST

1st Prize—Complete shop of DELTA Industrial type power tools and accessories **$1,750.64 Value**

2nd Prize—Complete shop of DELTA Homecraft power tools and accessories **$1,114.75 Value**

4 HONOR AWARDS—Four (4) to be given. Each consisting of a complete DELTASHOP (one motor combination of the most used power tools) and accessories **$386.80 Value each**

JINGLE CONTEST

1st Prize—Complete DELTASHOP (one motor combination of the most used power tools) and accessories **$386.80 Value**

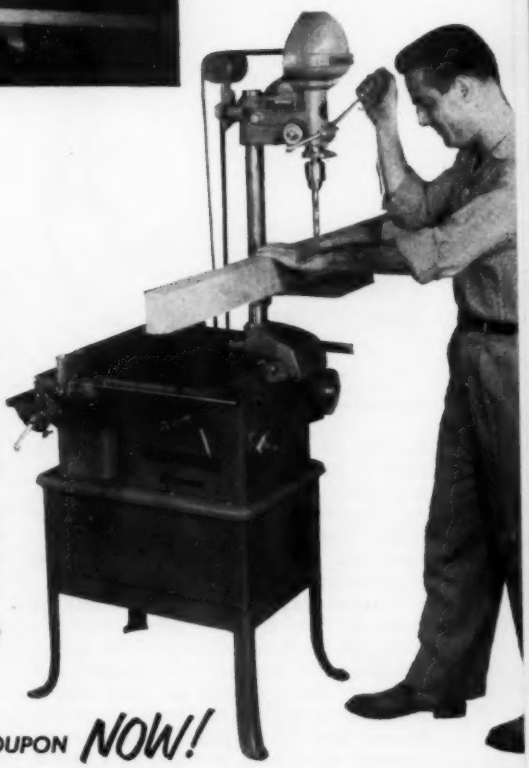
2nd Prize—DELTA (Homecraft) saw and jointer combination and accessories **$207.07 Value**

3rd Prize—DELTA (Homecraft) 11" Drill Press and accessories **$172.40 Value**

10 HONOR AWARDS—Each consisting of a Rockwell Saw Kit and four bound volumes of the Deltagram **$28.70 Value each**

FIRST PRIZE IN THE JINGLE CONTEST AND FOUR (4) HONOR AWARDS IN ESSAY CONTEST—THE DELTASHOP ... complete with twenty-two accessories . . . the only one-motor workshop with an 11" Drill Press, 8" Tilting Arbor Circular Saw, 4" Jointer, and a Disc Sander. With The DELTASHOP, even an amateur can turn out professional work. You can make your own furniture . . . build that addition to your home . . . handle the scores of jobs that require too much time with hand tools.

TOTAL VALUE $386.80



USE THIS COUPON

Fill in coupon with name and address. Clip, pin or staple to entry sheet or sheets. Upon receipt a code number will be assigned to each contestant and this number alone will appear when subject matter is being considered by the board of judges. *No entries accepted without a coupon.*

TEAR OUT THIS COUPON ***NOW!***

ROCKWELL MANUFACTURING COMPANY 5431A

Pittsburgh 8, Pa.

Attached find entry or entries for

ESSAY CONTEST ☐ **JINGLE CONTEST ☐**

Check in boxes provided. Where entries are submitted in both contests, check both boxes.

YOUR NAME_____ TITLE_____

COMPANY NAME_____

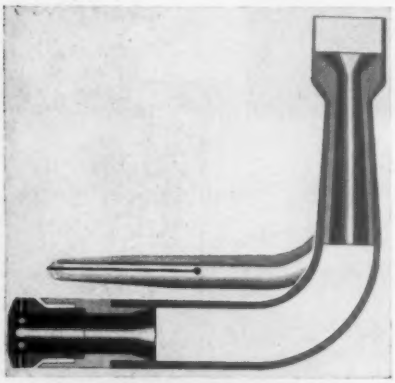
STREET_____

CITY_____ ZONE_____ STATE_____

2. Flexibility for satisfactory performance on all city gases and liquefied petroleum gas-air mixtures,
3. Elimination of the primary air adjustment,
4. Reliable instantaneous ignition or re-ignition at any heat setting, and
5. Small size and simple construction for ease of removing and cleaning.

The basic design principle of this burner with a nickel-sized head is not new. It has been widely used for many years on some industrial type burners and more recently on some double-duty range top burners. The low heat setting on this experimental single-duty burner is approximately 350 Btu per hour, and it can be operated at heat inputs in excess of 16,000 Btu on natural gas with stable flames and satisfactory combustion.

This wide span of heats was achieved with the same primary air opening—this burner has no air shutter to get out of adjustment. It lights or re-ignites instantaneously at any input rate from its own individual standing pilot which uses only

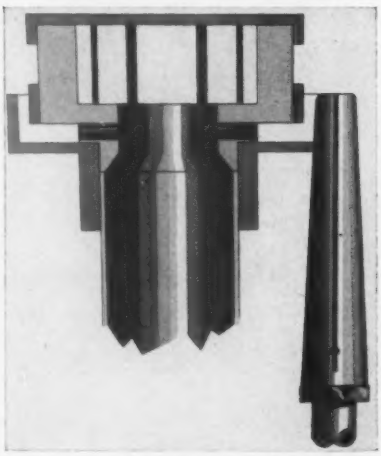


Nickel-sized burner

one-fifth the usual volume of gas. When rated at 9,000 Btu per hour, its efficiency is approximately 51% on natural gas under Approval Requirements tests. The burner yields satisfactory performance on city gases and 1,400 Btu liquefied petroleum gas-air mixtures.

In operation, the slot burns a ring of flame or "halo fire" just below the main ports, causing flame retention. This burner was purposely designed to be compact and simple to clean. Despite its small size, it is capable of speedily heating a pot of coffee or deep fat frying. It also can be throttled down with precision to a gentle warmth for holding coffee or cooked foods at serving temperatures.

Another burner designed at the AGA Laboratories has only eight ports and the minimum turndown rate is less than 300 Btu per hour on Cleveland's natural gas. To provide for instant lighting, this burner has somewhat the same ignition features as the nickel-sized burner described above, with a separately charged ignition port and carry-up slot lighting from an adjacent 50 Btu standing pilot. However, its separately charged ignition port is supplied with gas from the low heat side of a conventional



Slot port burner

double-duty valve. This burner operates satisfactorily on all city gases, including peak load gases, and satisfactory performance has been obtained on 3,200 Btu butane at a nominal rate of 7,200 Btu per hour.

This burner has no air shutter. When rated at 9,000 Btu per hour on natural gas, its efficiency is 49.2%.

The two ideas exploited in this design were:

1. Small number of ports allows a low turndown or simmer rate, and
2. Controlled flame pattern under the utensil helps raise efficiency and decreases heat losses.

Top pilots

The two pilots which light the two new burners are identical. They were developed as low Btu type pilots to meet the objective of an essentially cold range with fast, reliable ignition. With this type of pilot, it is possible to use one for each burner and eliminate the slight time lag or possible mechanical defects of a flash tube.

The heat input to each pilot is less than 50 Btu per hour so that its heat is not felt on top of the range nor in the kitchen on hot days. Total heat input for a four-burner top section would be less than 200 Btu per hour—much less than that of one standing pilot of conventional type. Actually, this heat is half of that given off by an idle person and less than one-fourth of the heat given off by an active person. With the small shields developed for them, these pilots have withstood light drafts, in excess of any that would normally be encountered in an enclosed range; acoustic tests, such as banging on various parts of the range; and outage tests from spill-overs.

For ease of adjustment, a small valve for complete shut-off of the pilot is supplemented with a compressible filter. An adjustment screw squeezes or releases pressure on the filter to control gas flow rate.

The main part of these pilots is a hypodermic needle. The gas is burned on the tip of the needle so that the flame is no larger than the bead of a small hat pin. The needle tip becomes red hot and acts as a flame stabilizer.

One interesting thing about these pilots is that the gas flame remains relatively unchanged with variations in line pressure. The variation between ½ normal test pressure (3.5″ wc) and 1¼ normal test pressure (8.75″ wc) is almost indiscernible.

Another ignition system, of new and improved design, to provide for a cooler top section and less heat loss to the kitchen, was shown. A common pilot for two burners operated in conjunction with short flash tubes to ignite the front and rear burners. With an input rating of about 100 Btu per hour on natural gas, this pilot operates satisfactorily at any gas pressure between 1¼ and ½ normal test pressure. The flames burn yellow at 1½ normal pressure, but no carbon is deposited. No cracking of gas has been evidenced.

The pilot burner consists of a stainless steel tube flattened and sealed at one end, with a hole drilled through one flat side. The pilot is mounted horizontally with the port facing downward. Its flame has no primary air and burns so that it envelops the portion of the tubing near the port, rendering it hot. This causes the pilot flame to be quite stable at very low heat inputs.

The low heat pilot can be used effectively for fast and reliable ignition. A conventional giant burner had been modified to illustrate one way of having a separately charged ignition port and carry-up slot. As with the experimental burners, it was possible to light the burner quickly regardless of whether it was at full heat input or at a reduced input, including the minimum operating rate of 1,200 Btu per hour.

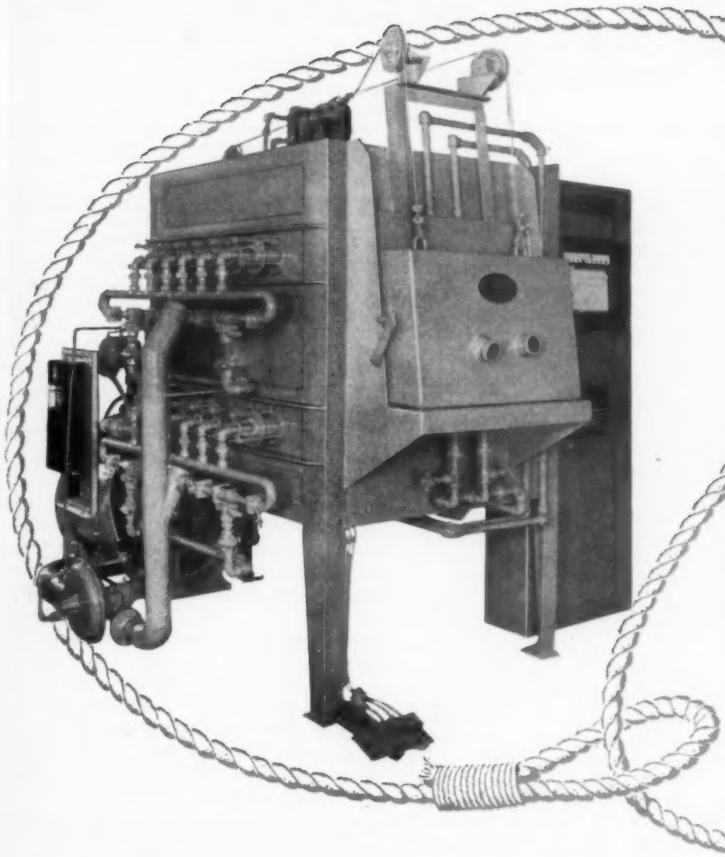
Also, the burner and carry-up slot will re-ignite in case of outage at any input. The original ignition charge port and carry-up slot have been blocked off from the gas supply to the main burner head. Gas is supplied directly to the ignition charge port through a separate orifice. The separate orifice in connected to one outlet of a conventional double-duty valve, with the main burner head being supplied in the usual manner from the other outlet of the valve. The usual delay of waiting for sufficient gas to pass through the burner mixing tube and burner head to the ignition port is eliminated. This general principle of ignition was developed at the Laboratories and publicized in Bulletin 50 in 1948, but has apparently not been used.

Incidentally, the efficiency of this modified giant burner is 49% at 12,000 Btu per hour input, and goes up to 56% when the input is reduced to 9,000 Btu. In the opinion of the Laboratories' staff, the minimum possible heat input or turndown rate of 1,200 Btu per hour is rather high, although some contemporary single-duty burners have a much higher minimum operating rate. Satisfactory operation is obtained on liquefied petroleum gases and all city gases.

Top valves

One simple expedient for providing faster ignition or re-ignition at any valve setting is through the use of a direct and full gas supply to the burner ignition port. This was exemplified with conventional valves. As soon as these

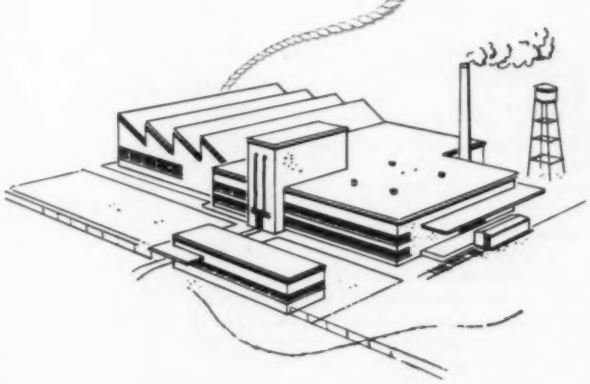
(Continued on page 42)



your profits are tied to INDUSTRIAL LOAD

Illustrated above is the new Gasmaco Hi-Temp Tool Room Furnace — which can be your most effective weapon to compete with electricity in an expanding field.

Heat treating in controlled atmosphere at temperatures above 2000° F. could not before be accomplished by gas fired radiant tubes. *Our new furnace employs Refractory Radiant Tubes* with furnace temperatures to 2500° F., controlled atmosphere, cylinder operated door mechanism, silicon carbide hearth, flue gas eductors, accurate temperature control, and economical gas firing.



Other Gasmaco furnaces are built for many forging and heat treating processes: Direct, Radiant Tube, or Convection Heated . . . Rotary or Straight Thru . . . High Temperature Roller Hearth . . . Cooling Tables and Conveyors, Charging Equipment and Manipulators.

Identified prominently with the gas industry for over a half century, The Gas Machinery Company for 24 of these years has been a manufacturer of industrial furnaces of all types. Our Industrial Furnace Division devotes its entire facilities to this field. Let us assist you in tying steady profits to your industrial gas load!!

THE GAS MACHINERY COMPANY

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Designers • Fabricators • Erectors
Gas Plant Equipment and
Industrial Furnaces

THE GAS MACHINERY CO. (Canada), Ltd.
HAMILTON, ONTARIO

News of the Gas Industry

A. J. Biard

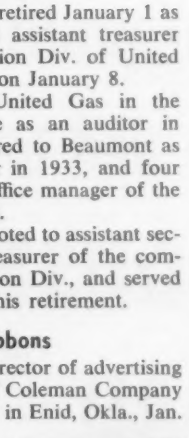
A. J. Biard, 65, who retired January 1 as assistant secretary and assistant treasurer of the Texas Distribution Div. of United Gas, died in Houston, on January 8.

Mr. Biard joined United Gas in the Houston general office as an auditor in 1931. He was transferred to Beaumont as division office manager in 1933, and four years later was made office manager of the firm's Houston division.

In 1946 he was promoted to assistant secretary and assistant treasurer of the company's Texas Distribution Div., and served in that capacity until his retirement.

Tom Gibbons

Tom Gibbons, 40, director of advertising and sales promotion of Coleman Company of Wichita, Kans., died in Enid, Okla., Jan. 24, from injuries received Jan. 3 in an automobile accident that occurred near Enid as he was returning to Wichita with his family from a New Year's holiday in Texas.



Tom Gibbons

Prior to joining Coleman last May, he was director of marketing of the Caloric Stove Corp., Philadelphia, after six years as advertising manager of Magic Chef, Inc., St. Louis.

He was widely known in the home appliance industry through his active participation in advertising, marketing and sales groups of Gas Appliance Manufacturers Association, American Gas Association and Liquefied Petroleum Gas Association.

A graduate of the University of Missouri School of Journalism, he was a weekly newspaper publisher in Missouri and Illinois from 1934 to 1942. He was in military service throughout World War II.

Survivors include his wife, Claire, whom he married in 1936; three children, John, 12; Mary, 9; and Elliot, 5; his parents, Mr. and Mrs. Frank Gibbons, of Gardena, Cal.; three brothers, Walter of St. Louis and Stanley and Harold of Gardena; and one sister, Mrs. O. R. Francis of Gardena.

TETCO Files for Storage Service

Texas Eastern Transmission Corp. and a wholly owned subsidiary have filed applications with Federal Power Commission for approval of a project involving a "gas storage service" for Transcontinental Gas Pipe Line Corp. Under the plan Texas Eastern will store 12 billion cubic feet of natural gas per year for Transcontinental, delivering the gas in the winter at a maximum rate of 133,500 Mcf of gas per day and receiving redelivery from Transcontinental during the summer. Transcontinental has agreements covering a 20-year period with seven of its customer companies in the New York, New Jersey, and Philadelphia areas, providing for redelivery to such companies under identical terms as the Texas Eastern-Transcontinental contract.

The agreements will permit greater use by Texas Eastern of its interest in the Oakford storage pool and make no new demands on Texas Eastern's gas supplies or reserves. Under this plan customer companies will purchase summer gas already contracted to them by Transcontinental under existing service agreements, and the customer companies will make that gas available for summer delivery into storage by Texas Eastern. In the wintertime that gas will be withdrawn from storage by Texas Eastern, delivered to Transcontinental, and then delivered to the customer companies.

To perform the service, the wholly owned subsidiary, Texas Eastern Penn-Jersey Transmission Corp., plans to construct and complete in time for operation in the fall of 1954 a new pipeline system at a total cost of approximately $31,000,000, including 265 miles of 24-inch pipeline extending from the Oakford storage field in western Pa. to the parent company's compressor station near Lambertville, N. J.

Form Pioneer Natural Gas Co

Effective January 1, Amarillo Gas Co., West Texas Gas Co., Dalhart Gas Co. and Clayton Gas Co. were consolidated into one natural gas utility operating company named Pioneer Natural Gas Co., a Texas corporation.

Pioneer Natural Gas Co. is now the utility company serving some 60 cities and towns throughout an area reaching from Clayton, N. M., on the north to Midland and Odessa, Tex., on the south.

The officers of Pioneer are as follows: Geo. Baird, president; M. D. Snyder, vice president and secretary; Thos. F. Cartwright, vice president and treasurer; H. R. Budke, C. I. Wall and A. F. Cox, vice presidents. Directors are P. C. Spencer, Joseph P. Walsh, Geo. Baird, M. D. Snyder, Thos. F. Cartwright, Ross D. Rogers and George W. Dupree.

Pioneer is owned 100% by Southwestern Development Co., a registered public utility holding company with offices in New York. Subject to approval of the stockholders of Southwestern, it is planned to liquidate and dissolve that company. A meeting of the stockholders to vote on the liquidation and dissolution of the company will be held on February 15. In the event of approval by the stockholders, the former Southwestern Development Co. seven-company system will have been transformed into a two-company system.

Colonel George A. Burrell Retires

Col. George A. Burrell, president of Atlantic States Gas Company of New York, Inc., and Atlantic States Gas Company of Pennsylvania, Inc., retired from the companies on February 1.

Colonel Burrell had been president for 16 years and was one of the founders of the companies, with which he will continue in an advisory and consulting capacity. A nationally-recognized gas and oil engineer, Col. Burrell will be succeeded by T. A. McEachern, Jr.

TGT Files for Northeastern Merger

Tennessee Gas Transmission Co. has announced the filing of an application with Federal Power Commission to acquire and operate the New England natural gas pipeline system of its wholly-owned subsidiary, Northeastern Gas Transmission Co.

The action would be through merger of Northeastern Gas into the parent company, and the merger will bring benefits to consumers in New England without detriment to present customers of Tennessee Gas, the application said.

One benefit will be several months' postponement of an increase in wholesale gas rates in New England, it was stated. If maintained as a separate company, Northeastern Gas immediately would file an application for a rate increase. But this has been delayed because of filing of the merger application.

After the merger, initial service to New England by Tennessee Gas is planned at no change from Northeastern Gas' present rates, and an application for an increase in those rates will not be filed until May 1, the application said.

Rockwell Sponsors Industry Contest

Rockwell Manufacturing Co. has announced sponsorship of a nation-wide contest for persons in the gas industry on the general subject of planned meter retirement programs in the industry.

More than $5,000.00 in prizes, consisting of Delta power tools, will be awarded to winners in two categories. The first category will be for an essay on "The Economics of a Planned Meter Retirement Program." The second category will consist of filling in the last line of a jingle.

Only those persons employed by gas utilities or those associated with gas utilities as consultants are eligible to participate. The contest closes at midnight, April 30, 1954. Further information may be obtained by writing Rockwell Manufacturing Co., Gas Meter Contest, 400 North Lexington Ave., Pittsburgh 8, Pa.

Doyle Retires from Pacific G&E Co

Frederick F. Doyle, a pioneer in the natural gas industry, has retired from his executive position with Pacific Gas and Electric Co. under the company's pension system, after a career in the gas industry that began more than 40 years ago.

Mr. Doyle was employed by the United Gas Improvement Co. of Philadelphia as a cadet engineer in 1912. He later became affiliated with the Midway Gas Co. in an engineering capacity. Shortly thereafter he was made superintendent of main lines, and later became general superintendent of all field activities. When that company was merged with Southern California Gas Co., Mr. Doyle was transferred to the Los Angeles Basin area where he was appointed supervising engineer in charge of all engineering for the merged companies.

He later resigned this position to join Pacific Gas and Electric as manager of the newly organized Natural Gas division. Upon his retirement from the company he holds the executive position of director of gas supply and control.

In 1930, Pacific Gas and Electric and Standard Oil Co. interests joined in forming the gas transmission line, Standard Pacific Gas Line Inc. Mr. Doyle has been manager of that company since it was organized, and also has been continuously on the board of directors.

Mr. Doyle joined Natural Gas Association of America in 1913, which later merged with American Gas Association. He is a member and former director of Pacific Coast Gas Association, and a member of American Petroleum Institute.

Name AGA Section Chairmen

The organization of the committees and subcommittees of American Gas Association's industrial and commercial gas section, for the 1954 Association year, has been completed.

The chairmen of the section's committees are as follows:

Managing, Charles C. Eeles, The Ohio Fuel Gas Co.; metals, K. I. Robinson, Public Service Electric & Gas Co. (N. J.); industrial processing, E. Gilbert Silven, Providence Gas Co.; industrial gas practice, E. L. Spangel, Rochester Gas & Electric Corp. (N. Y.); food service equipment, Charles C. Hanthorn, Philadelphia Gas Works Div.; commercial processing, George E. Marble, Michigan Consolidated Gas Co.; equipment improvement, Harry B. Wilson, Brooklyn Union Gas Co.; sales training, James J. Condon, Peoples Gas Light & Coke Co. (Chicago); committee on displays at national expositions, Clifford L. Nelson, Central Illinois Electric & Gas Co.; programs and papers, Lee Corn, East Ohio Gas Co.; and nominating committee, Terry Hart, Nashville Gas Co.

Smith Retires As Washington Rep

George H. Smith, Washington representative and assistant managing director of American Gas Association since he joined the Association in 1944, retired on December 31, 1953.

Mr. Smith served as chief, gas materials section for natural and manufactured gas, War Production Board, during World War II. He managed the Washington office of AGA since 1951, serving as a clearing house for government information for gas utilities, distribution and transmission companies. He also served eight years as managing director of the Empire State Gas and Electric Association with headquarters in New York.

Mr. Smith will maintain his association with the gas industry as a utility consultant for Bama Sales Co., Pittsburgh.

Curtis Morris has been appointed Washington representative of AGA, succeeding Mr. Smith. Mr. Morris will take charge of the Association's new office located at Room 804, Securities Building, 729-15 St., N.W., Washington, D. C.

Griffiths Co Issues Parts Catalog

The E. F. Griffiths Co. has announced publication of a new supplement to their regular catalog of appliance servicing ma-

Digs 4 to 5 Jobs Every Day

Hattendorf-Bliss meet heavy daily schedules of scattered jobs—regardless of soil and weather conditions—because their Clevelands *dig* them *on time, every time.*

Each extension crew of Hattendorf-Bliss, Inc., Cleveland, Ohio contractors, *completes* 4 or 5 jobs every day—trench dug, pipe laid, trench filled, job cleaned up. The jobs average 250-300 feet each, for 4, 6 and 8 inch pipe and require 10-15 miles of traveling through big-city traffic.

Hattendorf-Bliss have standardized on Clevelands for over 20 years. Currently the firm is working 9 Cleveland trenchers and backfillers for many types of trench work. In one 10-hour day, a Hattendorf-Bliss crew with one Cleveland trencher completed 11,000 feet—over 2 miles—of trench 19" wide and 30" deep for a 4" pipeline, including the crossing of a 20' stream.

"We go with Clevelands," say Hattendorf-Bliss, "because we know from experience they'll do every job we schedule them for. They stand hard usage and they're fast. Their full-crawler mounting and low bearing pressure protect lawns and sidewalks—we practically never have a damage claim. And because they're compact and easy to transport, we can really cover the distance between jobs with safety at good speeds."

Get the Full Story on Clevelands from Your Local Distributor

THE CLEVELAND TRENCHER CO.
"Pioneer of the Modern Trencher"
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PROOF

HERE'S HOW TAPECOAT® HAS STOOD THE TEST OF TIME TO SOLVE CORROSION PROBLEMS

PROOF (Underground) — Inspection of TAPECOATED joints after 10 years of underground service showed no sign of corrosion when the TAPECOAT was removed.

PROOF (Alternate wetting and drying) — Expense and trouble in protecting lines subject to wet and dry conditions at cooling towers have been eliminated since 1944 by coating with TAPECOAT.

PROOF (Underwater)—During the re-laying of an underwater pipe line in the Gulf area, examination showed that TAPECOAT had protected the pipe against salt water corrosion and barnacles.

PROOF (Above ground)—A gas line at a bridge crossing was TAPECOAT-protected in 1944. There has been no need for attention and *no interruption of service* since the pipe was TAPECOATED.

Actual experiences like these show what TAPECOAT coal tar protection can do for you.

Use TAPECOAT to combat corrosion above or below ground on gathering lines, transmission lines, meter stations, compressor stations, distribution lines, pipe joints, bolt-type couplings, fittings, large bends, large diameter pipe, insulated lines, tanks, and other surfaces subject to corrosion.

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The complete catalog is available on request from the company, 346 E. Walnut Lane, Philadelphia 44, Pa.

TGT Plans 1954 Construction

Plans for a 1954 Tennessee Gas Transmission Co. construction program to enlarge its natural gas pipeline system were announced recently by Charles S. Coates, senior vice-president.

The program includes laying approximately 637 miles of pipeline in Louisiana, Mississippi, Tennessee, Ohio and Pennsylvania, construction of two new compressor stations and enlarging five of its existing 26 stations.

The 637 miles of pipeline include a new 574-mile 30-inch pipeline to begin at the company's compressor station near Kinder, La., and extending northeast to join the existing pipeline system at the company's compressor station near Portland, Tenn. Also included are 63 miles of 26-inch pipeline to be laid parallel to sections of the existing system in Ohio and Pennsylvania between the Ohio River and the company's compressor station near Mercer, Pa.

The pipeline construction program is expected to begin about June 1, with completion of the work scheduled well in advance of the start of the winter heating season.

Reed Retires from UGI and PGW

At a recent meeting of the board of directors, Hudson W. Reed resigned as a director and vice president of The United Gas Improvement Co., and also as general manager of Philadelphia Gas Works Division, effective December 31, 1953.

Mr. Reed, nationally prominent in the gas industry, had been associated with the gas operations in Philadelphia since 1936, when he became vice president and general manager of PGW. He had been president of the company from 1942 until its merger into U.G.I. on January 1, 1953, when he assumed the titles he held at the time of his retirement.

Among Mr. Reed's many services to the industry was a term as president of American Gas Association in 1947-48.

Thomas S. Lever succeeds Mr. Reed as vice president of U.G.I. and general manager of the Philadelphia Gas Works Division, and George R. Bailey was elected a director, to fill the vacancy created by Mr. Reed's retirement.

Colo Interstate Completes Facilities

Colorado Interstate Gas Co. has announced that new and additional facilities, constructed during the last six months of 1953 at an approximate cost of $20,000,000, now are in operation.

The facilities provided by the construction program have added a total of 82,500 Mcf daily to the delivery capacity of the

company, which now is capable of delivering in the Rocky Mountain region a total of 508 MMcf of natural gas daily. This is in contrast to the 426 MMcf which the company could deliver before the construction program was undertaken.

Exec Changes At Lone Star Gas Co

Lone Star Gas Company has increased its executive staff to include six new vice presidents and an executive vice president, and has promoted two vice presidents to the rank of senior vice presidents, following a January meeting of the company's board of directors. The action is designed to meet the problems resulting from the growth of the company and its operating territory, D. A. Hulcy, president and chairman of the board, said.

Elmer F. Schmidt

In the board action, vice presidents Elmer F. Schmidt and Chester L. May, both of whom are members of the board, were elected senior vice presidents. L. T. Potter, assistant to the president, was elected executive vice president, and also to the board of directors. Marshall Newcomb, general counsel and member of the board, was elected a vice president.

Chester L. May

L. T. Potter

Other new vice presidents are Julian L. Foster, superintendent of transmission; E. A. Brown, manager of exploration and gas supply; M. L. Bird, operating manager of the general division of distribution; W. F. Wright, general manager of Dallas division of distribution, and Joe C. Darrow, general manager of Fort Worth division of distribution.

Mr. Schmidt, senior vice president and head of the company's transmission and production operations, joined Lone Star in 1918 and was placed in charge of gas measurement. He later served as chief engineer, then general superintendent. He was elected vice president in 1935 at which time he was also elected to the board of directors.

Mr. May, senior vice president who heads distribution operations, served as president and general manager of two distribution companies affiliated with Lone Star. Following reorganization of the company in 1942, when all distribution operations were merged, Mr. May was elevated to vice president in charge of all distribution operations. He was elected to the board of directors in 1949.

Mr. Potter, executive vice president, has been with Lone Star since 1928. Starting his career in gas measurement he later served as production engineer and production superintendent and was named assistant superintendent of the transmission division in 1945. In 1947, he was appointed assistant to the president, the position he held at the time of his election as executive vice president.

Mr. Newcomb, vice president and general counsel, joined the company in 1927 in the tax department and was transferred to the legal department as an attorney in 1928. He was named assistant general attorney in 1935 and in 1944 was named general attorney. His title was changed to general counsel in 1948 and in April, 1949 he was elected to the board of directors.

Mr. Foster, vice president and superintendent of transmission division, joined Lone Star in 1918. Three years later he was assistant general superintendent of the operating department and was promoted to general superintendent and chief engineer in 1935.

Mr. Brown, vice president and manager of exploration and gas supply division, was named manager of this department when it was created in January 1949. He joined

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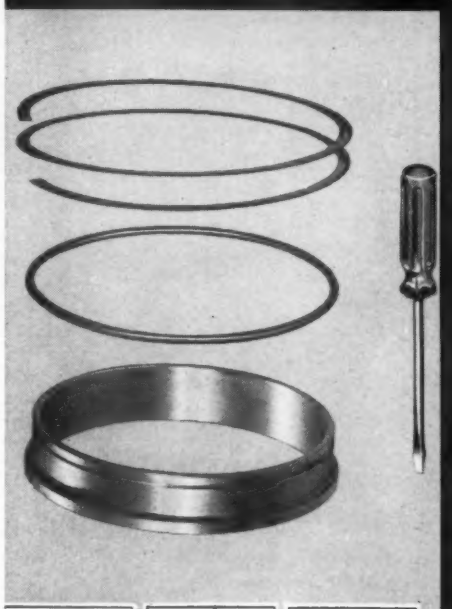

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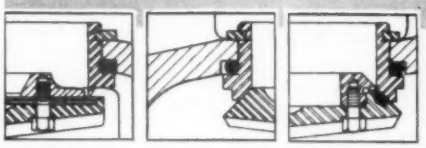

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Lone Star in 1932 as a clerk in production engineering. He served as office production engineer, assistant production engineer and chief production engineer, and in 1947 was named superintendent of production.

Mr. Bird, vice president and operating manager of the general division of distribution, joined the company in 1925 as a construction engineer. In 1928 he was placed in charge of construction of distribution plants. The following year he was named general superintendent of the company's West Texas distribution territory, and in 1935 was appointed superintendent of the Abilene division of distribution. He was named operating manager for the company's entire general division of distribution, in 1949.

Mr. Wright, vice president, has been general manager of the company's Dallas distribution operations since 1944. Prior to a reorganization at that time, he was vice president and operating manager of the former Dallas Gas Co., which was absorbed under the single company name. He had served as general superintendent, Dallas and Fort Worth distribution operations, and later, in 1929 was vice president and general manager of Fort Worth Gas Co. which also dropped its name with the 1944 reorganization.

Mr. Darrow, vice president of Lone Star and general manager of Fort Worth distribution division, has been with the company since 1927. He served as an engineer and as assistant construction foreman, and later worked as a home service engineer. He was made superintendent of distribution operations, Dallas, in 1946, and Abilene division superintendent in 1949. Late in 1951 he was transferred to his present position as general manager of the Fort Worth division.

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Home Builders Set 10 Year Goal

An industry objective calling for the building of 1,400,000 housing units annually during the next 10 years was set recently by the National Association of Home Builders, at the association's convention.

A statement of policy adopted by delegates said population gains and the need for replacing millions of substandard homes justified this new peak level in output. They asked mortgage men to do their part in meeting the challenge by providing a steady flow of funds to finance building.

New homes are now being constructed at the rate of about 1,000,000 a year, and the industry has added 8,000,000 units to the nation's supply in the post-war period. The industry feels however, that the market could absorb a new peak level of nearly 125,000 units a month.

In order to meet this higher level, the builders say, lenders must "accept their responsibility to provide adequate credit."

The association went on record as favoring the lifting of mortgage limits on loans insured by Federal Housing Administration, giving recognition to current high-price levels.

PAD Names Pipeline Study Group

Six executives of natural gas companies have been appointed by Petroleum Administration for Defense to serve as consultants for a study aimed at the development of a plan for boosting pipeline capacity between the Texas-Gulf Coast area and the East Coast, the PAD has announced.

The phase of the study which will be considered by the gas industry consultants will be to explore the possibility of interesting private industry in the construction of a large capacity pipeline for use during peacetime to transport natural gas but which would be available for immediate conversion for transporting crude oil in the event of war.

Those selected to serve as consultants are: Walter E. Caine, vice president, Texas Eastern Transmission Co.; John H. Carson, vice president, The East Ohio Gas Co.; J. J. King, vice president, Tennessee Gas Transmission Co.; A. Dale Green, vice president, United Gas Pipe Line Co.; Walter H. Davidson, general superintendent, Transcontinental Gas Pipe Line Co., and Wilbur T. Shinholser, vice president, Columbia Gas System Service Corp.

W. H. Adams Retires from AGA

W. H. Adams, safety consultant at American Gas Association since 1951, retired on December 31, 1953, it was announced by the Association. A veteran of more than 50 years' service in the gas industry, Mr. Adams joined the Association after serving as safety director of The Manufacturers Light & Heat Co. in Pittsburgh.

He directed the Association's accident

prevention campaign and rendered service to gas utility and pipeline companies in analyzing their problems and in helping to initiate or supplement safety programs for AGA member companies.

Mr. Adams is a past-chairman of the AGA accident prevention committee, and past-chairman of the public utilities section, National Safety Council.

Court Acts On Misuse of AGA Seal

A United States District Court in San Francisco, acting on a suit instigated by American Gas Association in September, 1953, recently issued a decree prohibiting the defendants, gas water heater manufacturers and distributors, from unauthorized use of AGA's seal of approval.

The defendants, Jud Whitehead Heater Co., Judson J. Whitehead, Jr., the Electric Kitchen Appliance Co., and the Hynes & Cox Electric Corp., all of whose industry activities are principally in California, were found to have "repeatedly used, affixed or displayed the certification trade-mark, of the Association, upon gas water heaters manufactured, produced, assembled, or distributed by said defendants, which gas water heaters have not been tested or approved by the plaintiff."

The court also found that the defendants had made or sold untested and unapproved water heaters "which did not comply with the safety standards and requirements of the plaintiff and which were unsafe, inefficient and unfit for use by the ultimate consumers or users of said gas appliances."

As a result of this action, the defendants were ordered to cease using the AGA certification trade-mark or any imitation or reproduction thereof, on any water heaters or other gas appliances made or sold by them unless such use is actually authorized by the Association.

The defendants were further ordered to surrender all material and advertising displaying the approval seal and all plates or molds used to make them. They were also instructed to remove the seals from all gas water heaters or other gas appliances made or assembled by them.

The decree provides that the defendants furnish AGA with the names of all persons selling their products and a complete list of the recipients of their gas water heaters which illegally carried the seal. Finally, the defendants were ordered, within 30 days after submitting such lists, to notify such recipients that these heaters had not been approved by AGA, do not meet its standards or requirements, and are not authorized to bear the seal of the Association.

Display of the Association's certification trade-mark on unauthorized equipment is a violation of the Lanham Act covering trade-marks and certification marks and this suit was among the first proceedings brought under the certification trade-mark provisions of that Act.

Ryerson Is Carlon Pipe Distributor

Joseph T. Ryerson & Son, Inc., is now distributing plastic pipe and fittings produced by Carlon Products Corp., the industrial plastics division of Ryerson Co. has announced.

Flexible and rigid plastic pipe are being sold by the division, in a number of compositions, for use in all types of low pressure lines handling liquids, corrosive fluids, gases, vapors, and wastes. In addition to plastic pipe and fittings supplied from stock, service is available on custom produced plastic pipe for special applications.

MacLean Is Chief Eng. at Mueller Co.

Allen D. MacLean, gas industry engineer and author of many articles and hand books, has been named chief products engineer for Mueller Co.

Allen D. MacLean

Mr. MacLean was a chief draftsman for a Cambridge, Mass., valve company before he joined New Departure Manufacturing Co., a division of General Motors Corp., as an engineer in 1919.

In 1926 he joined Pittsburgh Equitable Meter Co., now Rockwell Manufacturing Co., as chief engineer. The company made him vice president and chief engineer in 1940.

Until his recent appointment with Mueller Co., he was chief engineer of Chaplin-Fulton Manufacturing Co., with which company he retains a consulting position.

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Rider Is Bklyn Union Pub-Adv Mgr

Frederic H. J. Rider has been named manager of the publicity and advertising department, Brooklyn Union Gas Co., succeeding Howard A. Praeger who has resigned.

Mr. Rider joined Brooklyn Union as a customers' service clerk in the commercial department in 1931. In 1933, he became a trainee and was transferred to the new business department upon completion of his training. In this department he was a salesman, district representative and district sales manager.

In 1948, Mr. Rider was promoted to assistant manager of the publicity and advertising department.

Rockwell Names Two New Managers

The Meter and Valve Div. of Rockwell Manufacturing Co. has announced that Orville W. Barnett, former manager of Nordstrom valve distributor sales, is now Nordstrom valve products manager; and George A. Cunningham, former assistant gas products manager, has been named gas products manager. The two men jointly succeed Gilbert T. Bowman, former Nordstrom valve and gas products sales manager, who has been elevated to the newly created post of manager, products department, supervising activities of all product managers in the Meter and Valve Div.

N. Y. Bank Forms Industries Group

The board of directors of The National City Bank of New York has announced the appointment of Edward B. White, formerly an assistant vice president, as a vice president, to head the newly-constituted Public Utility Department. The department is one of the units in the special industries group which has just been formed within the institution in which will be concentrated supervision of the bank's business in the public utility, petroleum and transportation industries.

Issue Newport Gas Light Co History

A booklet recording the first one hundred years' history of The Newport Gas Light Co., R. I., and featuring unusual and interesting information about the company, has just been published.

Beginning with the story of David Melville, who first introduced gas street-lighting to America, in Newport, R. I., 1806, one year before gas was first used to light the streets in London, the book proceeds to tell about the incorporation of the company in 1853.

Figures relative to miles of pipe, number of customers and fuel rate at various times during the evolution of the company are presented in the booklet, which is liberally illustrated with pictures taken both recently and many years ago.

Ebasco Services Promotes Two

The appointment of W. H. McInnis as manager, and M. G. Kennedy as assistant manager, of the sales, marketing and public relations department, Ebasco Services Inc., has been announced. Mr. McInnis, for the past four years, has been assistant manager of the department, while Mr. Kennedy became a sales and public relations consultant with Ebasco in 1950.

Facts on the Law of Representation

(Continued from page 21)

grounds that it was impossible to obtain the Venetian blinds, and that although he did not actually deliver to the apartment the gas stoves and cabinets, yet he could have furnished them at any time had the purchaser called his attention to it before buying same.

In holding the seller of the building not liable, the court said:

"We are convinced from the record that Venetian blinds were unobtainable. Defendant's (seller's) agreement to furnish the stoves certainly cannot be distorted into an agreement to permit the plaintiff (buyer) to purchase stoves of his own selection. . . . The same may be said of the cabinets."

In this case, if the purchaser of the building had within a reasonable time notified the seller that he required the stoves, cabinets and blinds, the seller would have been liable in damages for failure to deliver these items. However, the court would not sanction the purchaser of the building buying the items, and then demanding the seller to pay.

Thus the gas company, which sold the items, was compelled to seek collection of its due money from the purchaser of the items, because the court would not assume that the purchaser

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of the apartment building had either implied or expressed authority or representation to purchase merchandise that the seller of the building had promised to buy. This is so although, subsequently, a court held that because the seller of the building breached his contract with the purchaser, the latter could sue and recover from the former the full value of the items purchased from the gas company to fulfill the terms of the seller's original contract. In other words, no court will permit any person to take the law into his own hands.

Authority of general agent

Ordinarily a "general" agent is one authorized to make valid contracts, guarantees, and promises within the scope of the department that he manages. A "special" agent has no broad authority.

A gas company is liable for all acts, within the scope of his business, of a "general" agent, while under the same circumstances it is not responsible for the acts of a "special" agent.

Legally, a general agent is an employee who has general authority to act for his employer in the conduct of a business or department of the business. A special agent is one authorized to act for his employer in a capacity, as doing single, or several specific, acts.

In the recent case of Brager v. Levy, 90 Atl. 102, the court explained the extent of a company's liability for the acts of a general agent, and said:

"A general authority empowers the agent to bind the employer by all the acts within the scope of his employment, and that power cannot be limited by any private order or direction not known to the party dealing with the event. . . . It extends further and binds the employer in all cases where the agent is acting within the scope of his usual employment, or is held out to the public, or to the other party, as having competent authority, although in fact he has in the particular instance exceeded or violated his instructions and acted without authority."

Also, see Perry v. Kumberly Company, 23 S. E. (2d) 471, where it was shown that a department manager made a contract for his employer. During the trial the manager testified that he had no authority from the company's directors to sign the contract, and that in so doing he was acting for himself personally and not for the company. However, he admitted that he was the general manager of this department. Therefore, the court held the company liable on the contract.

Another important legal rule directly related to agents is as follows: Although an agent is a special agent, and his employer is not ordinarily responsible for his contracts, statements and guarantees, the employer is responsible for the agent's deceitful or fraudulent statements, if the testimony proves: (1) that the conduct, acts, language, or silence on the part of the agent amounted to a representation or a concealment of material facts from the purchaser; (2) that these facts were not known to the purchaser at the time the transaction was completed; (3) that the truth concerning these facts was unknown to the purchaser at the time when it was acted upon by him; (4) that the acts of the agent were done with the intention, or at least with the expectation, that the purchaser would have been influenced; (5) that the conduct or promises of the agent were relied upon by the purchaser and, thus relying, he was caused to make the agreement.

Therefore, it is well established that although an agent or employee practices deceit upon a purchaser, the latter has no legal recourse if the evidence indicates that he did not believe or rely upon the deceitful or fraudulent statements. Still another important point is that a deceitful or misleading statement made after the sale does not give the purchaser any legal right of recovery against the agent's employer.

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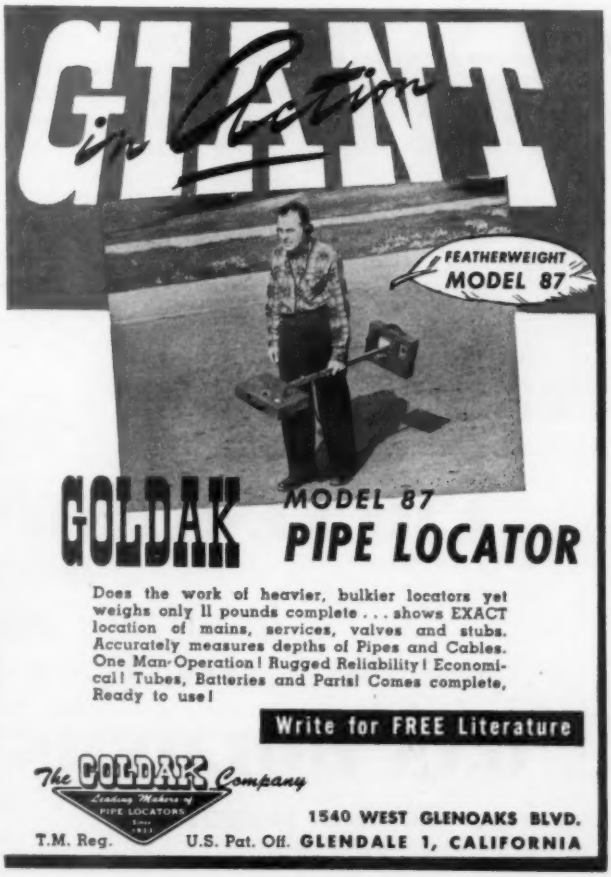
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Mechanics of Pipeline Cost Allocation

(Continued from page 19)

to "accumulative Mcf" from the preceding card.

4. The new "accumulative Mcf" from 3, above, is punched into the card in columns 37-47. It is also stored in the machine for accumulation to the next card.
5. "Order number" from 1, above, will be punched into columns 7-9 in the card at the same time "accumulative Mcf" is punched.

At the completion of the above calculation, the summary cards were ready to be spread over the original sales cards which were key punched. This was done as follows:

1. The zone 1 summary cards were merged in with the zone 1 sales cards by date.
2. This merged deck was processed through the 604. The "accumulative Mcf" field on the summary card was added to the "gross excess" field on the summary card and the total was prorated over only the plus excess sales cards for that date on the basis of "gross excess." This prorated amount was punched into the zone 1 spread field, columns 73-80.
3. The amount in the "excess" field on all credit excess cards was punched as a credit into the zone 1 spread field, columns 73-80.

The same prorating operation was repeated for zones 2 and 3. The zone 4 summary cards were then prorated over the sales cards for zones 2 and 3 in the same manner except that the amounts were punched into the zone 4 prorated spread field, columns 65-72. The last calculating operation was to spread the zone 5 summary cards over all sales cards and punch the amounts into the zone 5 prorated spread field, columns 57-64.

At this point the processing had been completed on both the sales cards and the zone summary cards. All that remained then was to list off the cards in a form which was most convenient for the preparation of the expense allocation base.

The zone summary cards were sorted by "order number" within zone and listed to show:

- Order number
- Date
- Zone number
- Net excess over average
- Gross excess over average
- Accumulative Mcf

Totals were printed for each zone with a grand total at the end.

The sales cards were sorted by date within type, within zone and listed showing:

- Date
- Zone number
- Type
- Sales in Mcf
- Excess over average
- Prorated spread
  - Zone 5
  - Zone 4
  - Individual zone

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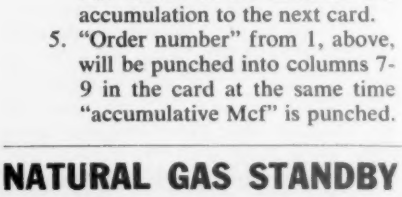

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Totals were accumulated for all three prorated fields. Minor totals were taken by type; major totals by zone and a grand total at the end.

One additional report was made from the sales cards. They were sorted by the magnitude of the "zone 5" prorated spread field, then by type and then by zone. Listing the same information as above described, totals were taken again at the same levels, by type, by zone with a grand total at the end.

The three reports described above provided the data required to allocate costs on the basis of Mr. Nissel's capacity credit method. Naturally this same setup can be employed very nicely for either budgeting purposes or for forecasts of expenses by the required types of customers in various geographic locations, under various load factor estimates.

The primary advantage in using this machine method is that once set up on the I.B.M. equipment, any number of trials may be run through with varying base information, requiring only 3-to-4 hours of key punching and 2-to-3 hours of machine time. For budgeting purposes of course, this allows a possibility of experimentation which was previously considered impractical without the use of a machine method such as this.

Business Shows Constructive Attitude Toward 1954

(Continued from page 20)

come taxes and the recommendation of the House Ways and Means Committee that Congress correct the present onerous double taxation on dividend income. Assuming no change whatever in dividend payments, this legislation, if finally enacted along lines now suggested, would mean dividend tax reductions ranging from approximately one-third to one-fourth of present dividends after taxes, depending on the size of the individual's security portfolio and on the extent of his tax liability. Since such a tax reduction would have the effect of commensurate increase in the amount of dividends received, it cannot help but revive purchases of stocks as income producers by medium and upper income bracket individuals who in the past represented the principal source of buying power for corporate common shares.

It is estimated that elimination of the double taxation on dividends would save stockholders as a group, an amount varying from $240 million in 1954 to roughly one billion dollars in 1956 on the basis of current payments to shareholders of the nation's corporations.

If improving liquidity is any criterion, however, corporate managements actually may be able to increase distributions to shareholders this year. Present indications are that the combined provision for depreciation and amortization this year may exceed $15 billion, compared with $13 billion in 1953. The substantial increase will result partly from progress made to date in completing projects under the defense mobilization program. So far, of the $29 billion of certificates of necessity granted, 60%, or $17.5 billion, is eligible for rapid amortization. Without any increase in reported earnings, a stronger current ratio and an improved cash position should be reported at the end of 1954 because of the size of non-cash writeoffs, aside from a degree of inventory contraction.

As a further, and more remote possibility, corporations might get another break toward additional husbanding of their resources if a move discussed in recent conferences actually should be put in effect. Under discussion is the advisability of permitting corporations larger depreciation allowances on properties, without a certificate, permitting writeoff of about two-thirds of the cost of new properties over a five-year period.

It is conjectural under such a development what, if any, allowances would be made for companies whose new properties have been in operation for some period prior to putting such a step into operation. If a property were in operation for say two years prior to such time, no basis obtains for determining whether the company would be permitted three-fifths of the indicated allowance or whether the credit would start with adoption of the rule, if it is adopted.

Refractory Materials for Gas-Fired Equipment

(Continued from page 17)

logical advantages of high speed heating are sufficiently great to absorb the effect of sudden heat shock on refractory materials.

To an increasingly greater extent, ideas on insulating values are being revised by changing needs of industry—particularly that of reducing unit labor costs. High speed heating requires materials with higher conductivity to withstand high thermal stresses. These needs indicate that we may expect significant revisions both in the selection of materials and in furnace design.

Adapted from an
Information Letter
Glass and Ceramics Subcommittee
of Industrial Processing Committee
Industrial and Commercial
Gas Section
American Gas Association

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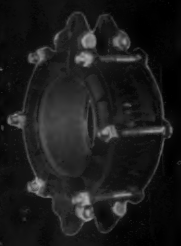

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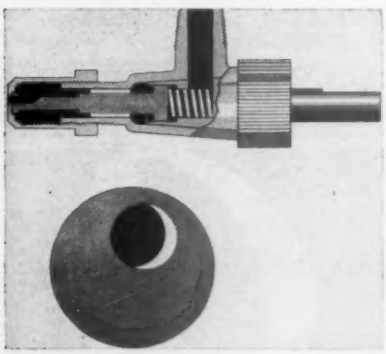
Newly Developed Principles of Domestic Range Equipment Presented to Industry

(Continued from page 30)

valves are moved from "off" to any "on" position, a full stream of gas flows through the low heat side of the valve to the burner ignition port. The other side of the valve supplies gas to the burner head.

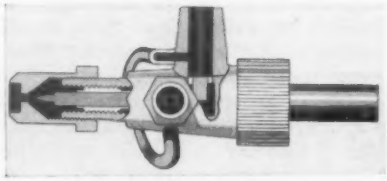
There is no real modification of these conventional valves, but they are employed to serve a different purpose than usual. Total valve handle rotation available is 230°, although the first 170° of this rotation has no effect on controlling gas input rate to the single-duty burner but simply acts as a seal or supplies gas to the ignition port. To overcome the long turning between ignition and burner "on" positions, these valves would have to be modified by repositioning openings in the valve plug.



Variable orifice valve

For precision control of low heat inputs to single-duty top burners, a new valve was developed at the Laboratories. With an effective rotation span of 250 degrees, it allows a better selection and reproduction of the low heat inputs. The principle of operation is simply to rotate one orifice past another, so that full heat input is obtained when the two holes are completely matched. It differs from a conventional valve in permitting full pressure at the orifice in any valve position, thus the wide control range. In a conventional valve, the only control is obtained when the port opening is smaller than the orifice.

Another possibility for improving heat control was shown with a needle-type valve which has a total rotation of 270° with an effective span of 200°. By modifying the taper of the moving pin, changing the thread pitch for its travel, and relocating the rotation stop, the AGA Laboratories approached the type of control desired with a single-duty contemporary valve. To provide for the separate ignition port gas supply featured with the double-duty valves, a small by-pass was added external to the valve body.



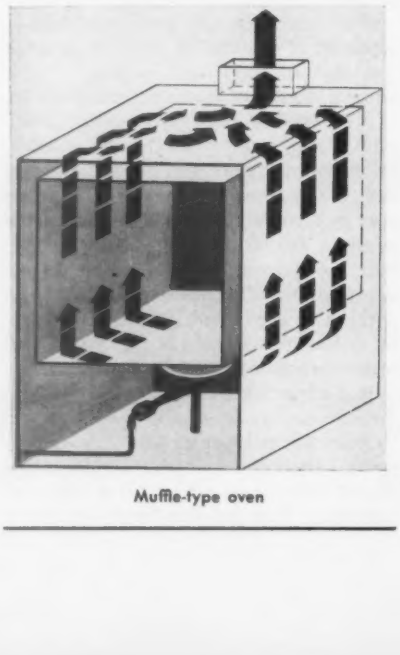
Traveling-pin valve with by-pass

A third new method for controlling top burner heat was presented separately in the product of an independent inventor. It has the desired characteristic of linear heat control and makes "number cooking" possible. The important working part is a small brass sleeve with a wedge-shaped opening which is gradually opened as more heat is desired.

Muffle-type oven

Advantageous features of an experimental oven shown by the Laboratories staff are:

1. Fast preheat and low heat loss to the kitchen,
2. Excellent baking characteristics,
3. Very low oven maintaining temperature,
4. Cool surfaces,
5. Small burner representing savings on materials of construction,
6. Low input automatic pilot,
7. Adaptability for inclusion in a complete gas range without any special problems providing a separate (high) broiler is used, and
8. Explosion-proof design.

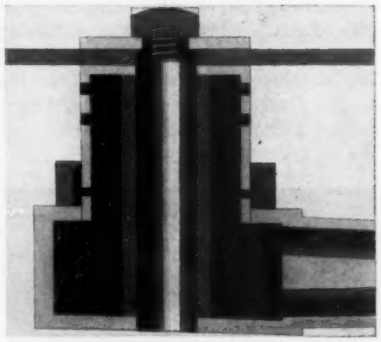


Muffle-type oven

This muffle-type oven is heated by the passage of hot gases from the burner upward around the sides and back, and across the top of the oven compartment. No combustion products enter the oven baking compartment.

With a nominal input rate of 21,000 Btu per hour to the small circular experimental burner and 6% CO_2 in the flue gases, flue losses to the kitchen have been cut by 15%, as compared with many typical fresh air ovens. As a "heat miser", the average oven surface temperature rise is 35% less than that of several typical fresh air ovens. The 100 Btu per hour pilot heats the oven to 98° F on an 80° day. Safety, economy and speed of operation, and cooler operation are prime achievements in this design.

Speed of preheating to a balanced oven temperature of 400° F is only 5½ of the 10 minutes permitted by requirements. This oven gives uniform baking and browning of standard test cakes, pumpkin pies, and buttermilk biscuits.



Low-heat oven burner

The burner used in this demonstration may be turned down so that, with its automatic pilot, a minimum by-pass rate of 1,000 Btu per hour is obtained. This low rate makes it possible to maintain an oven temperature of only 190° F on an 80° day.

This oven, labeled "explosion-proof," was subjected to tests with both natural and manufactured gases. Delayed ignition at either the burner or flue outlet caused no damage, and the oven door stayed closed throughout the gamut of lean to rich explosive mixtures. The severest reaction obtained with flash back from the flue only tended to open the combustion chamber door a fraction of an inch.

The experimental burner was designed for city gases with flexibility on peak load gases, as well as for good turndown characteristics. It has not been perfected for use on liquefied petroleum gases, although it is felt this can be done. Its physical size is only half that of typical current oven burners.

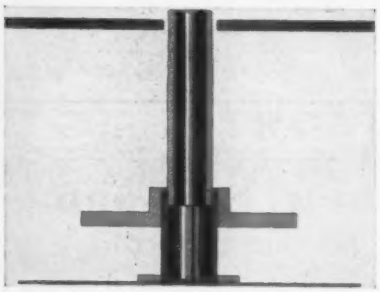
A feature of this oven is that its performance is not particularly dependent upon the type of burner used. A conventional bar burner was modified by reducing

the number of ports and substituted for the experimental burner. It was also rated at 21,000 Btu per hour. CO_2 was increased in the flue gases to 8.6% with good combustion, and thereby decrease flue losses to the kitchen by 30.7% as compared with typical fresh air ovens. Primarily because this burner had to be mounted lower in the combustion chamber than the first experimental burner, preheating time to 400° F was increased to 6½ minutes, which is still reasonably fast. The acid test of baking cakes yielded uniformly browned products which were well within requirements limitations. This conventional type burner and its pilot could only be turned down to 1,730 Btu per hour, so that minimum oven temperature was 250° F in an 80° room.

Broiling compartment

A new or little-used element was introduced by the Laboratories in broiling with a golden flame burner. The objectives here include:

1. Fast, uniform broiling heat over a wide area,
2. Effective use of heat to minimize heat losses to the kitchen,
3. Broad span of heats down to and including a low pilot heat with a simple burner, and
4. Smokeless broiling with luminous or radiant-type flames, for their psychological effect.



Radiant-flame broiler burner

One of the features is fast, even heat distribution. Bread placed about 2¾" below the ports browns evenly over the usable pan area within approximately 3½ minutes from a cold start. The area covered in this demonstration is 36% greater than that covered in many typical broilers.

Not only does this smokeless broiler take merely 10 of the 16 minutes permitted by requirements to preheat our test thermocouples to 530° F above room temperature, but its radiant flames also start to broil meat as soon as it is turned on. Whether thick or thin, with the radiant flame, meats remain rare and juicy in the center. From a cold start, a ¼" thick steak placed 2" below the ports requires about 10 minutes, while a 1" thick steak reaches the desired degree of broiling in 17 minutes. Heat released to the kitchen is materially reduced to about 2/3 of that normally released by some conventional broilers. For technical substantiation of this low heat loss, CO_2 in the flue gases of this broiler is increased from a typical concentration of about 3.5% to 5.6% and the burner has a rather low heat input rating of 14,000 Btu per hour.

With the usual glass wool insulation, and asbestos stripping to minimize metal to metal heat conduction, a fairly cool exposed surface is obtained. The metal door handle was only 14° above room temperature when the Approval Requirements test was applied. The door reached 57° above room temperature.

The oven and broiler doors are equipped with gasketing materials to prevent leakage of hot gases or cooking vapors that might deposit unsightly stains. Although it is not certain that such door gaskets or seals will last the life of the range, they have reached the point of development where they offer interesting possibilities. Some materials have been used intermittently for several months without damaging them.

The Laboratories have aimed consistently at maintaining lower exterior surface temperatures on this equipment to minimize the hazard of burning by personal contact and to reduce heat losses to the kitchen.

The simple, small burner is only 1/24 the conventional size and can be turned down to 160 Btu per hour. This offers the possibility of using the burner as its own standing pilot, particularly if a thermal-sensitive device is adapted to shut off the gas in the event of flame outage. This burner operates satisfactorily on city gases and most peak load gases, but has smoky flames on straight butane or 1,400 Btu butane-air.

Design and Operation of a Pressure Alarm System

(Continued from page 15)

40 volt DC normally closed relay—telephone type—is wired in series in the telephone line. The leased telephone line contains a resistance of 672 ohms. The resistance of the relay is 2,100 ohms, and it required a minimum operating current of 0.0082 amperes.

Whenever the circuit is broken at the plant by one of the control panel relays, the relay at the emergency station closes the alarm circuit causing a buzzer to ring. This buzzer receives ringing current through a 10 volt AC transformer. A switch is provided in the circuit so that the alarm may be turned off by personnel at the emergency station until the trouble is corrected. Upon notification by gas company personnel the switch is closed, and the alarm system placed back in operation. In the event of a break in the telephone line the circuit will be broken and the alarm will sound. Investigation will disclose that there is no pressure trouble, and the break then can be located.

A 110 volt AC relay is installed in the 110 volt AC supply line so that failure of power at the station will close a circuit energized by a six-volt battery. A bell in this circuit will ring to alert the personnel at the emergency station to the power failure. This is necessary since the system relies upon line current to supply the rectifier and ringing current for the alarms.

This system is now the police device to alert proper personnel at the time pressure trouble occurs. It is on guard 24 hours a day and will provide the extra time which is so important when pressures decline and threaten to cause domestic outage. Like any mechanical device it has imperfections, but all of the contingencies have been provided for, and the small investment is well worth the safety afforded.

MEN AT WORK

Robertshaw-Fulton Promotes Jeffers

The Robertshaw-Fulton Controls Co. has announced the appointment of Thomas H. Jeffers to the new position of assistant general manager, Anaheim Div., and his election as an assistant vice president.

VERNON J. ALT is now a district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

THOMAS BAIZE is now sales assistant, Philadelphia office, *Sharples Chemicals, Inc.*

FRED H. BAUER has been named district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

BERESFORD N. CLARKE has been assigned to Ft. Wayne office, sales engineering, *Surface Combustion Corp.*

HENRY S. GOLDSMITH is now a district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

ALBERT W. GREEN is now Winkler district representative, Pacific northwest, U.S. Machine Div., *Stewart-Warner Corp.*

ARTHUR M. GUENTHER has been appointed district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

WALTER R. LEANDER is now regional sales supervisor, U.S. Machine Div., *Stewart-Warner Corp.*

WILLIAM P. LORENTZ has been made a district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

HUGH W. MCINTYRE is now in Detroit Industrial sales office, *Surface Combustion Corp.*

RONALD P. MONTGOMERY has been appointed purchasing agent, Rockwell Meters, Inc., subsidiary, *Rockwell Mfg. Co.*

PAUL E. QUINN is now manager of Elizabeth and Suburban Gas Co., subsidiary, *Pennsylvania and Southern Gas Co.*

ROBERT J. SKARDA was appointed a district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

WILLIAM STEED has been made a representative, in the southwest, *Sharples Chemicals, Inc.*

JOSEPH B. WARSHAUER was named a district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

HAROLD R. ZEAMER has been appointed manager, Philadelphia sales office, *Richmond Radiator Co.*

WILLARD ZEHR is now a district sales manager, U.S. Machine Div., *Stewart-Warner Corp.*

GAS INDUSTRY CALENDAR

February

8-12 Western winter radio-television & appliance market, Western Merchandise Mart, San Francisco.

March

4-5 AGA transmission and storage conference, Jung Hotel, New Orleans.

15-17 Mid-West Gas Association, annual meeting and convention, Fort Des Moines Hotel, Des Moines, Iowa.

25-26 Oklahoma Utilities Association annual convention, Biltmore Hotel, Oklahoma City.

25-26 New England Gas Association, Hotel Statler, Boston.

April

12-14 AGA Sales Conference on Industrial and Commercial Gas, Edgewater Beach Hotel, Chicago.

13-15 Southwestern gas measurement short course, University of Oklahoma, Norman, Okla.

20-23 AGA Distribution, Motor Vehicles and Corrosion Conference, Mount Royal Hotel, Montreal, Canada.

22-23 Indiana Gas Association, annual meeting, French Lick Springs Hotel, Chicago.

26-28 Mid-West Regional Sales Conference, Edgewater Beach Hotel, Chicago.

26-28 The 1954 annual convention, Southern Gas Association, Houston.

May

10 (week) 35th Annual National Restaurant Convention and Exposition, Navy Pier, Chicago.

10 (week) AGA commercial gas school, Chicago.

10-13 LPGA Annual Convention, Conrad Hilton Hotel, Chicago.

19-21 GAMA annual meeting, The Drake, Chicago.

24-26 AGA Production and Chemical Conference, Wm. Penn Hotel, Pittsburgh.

27-28 Natural Gas and Petroleum Association of Canada, Prince Edward Hotel, Windsor, Ontario, Canada.

June

20-24 Canadian Gas Association, Banff Springs Hotel, Banff, Alberta, Canada.

27-29 Wisconsin Utilities Association, accounting section annual convention, Dell View Hotel, Lake Delton, Milwaukee, Wis.

28-29 Michigan Gas Association, Grand Hotel, Mackinac Island, Mich.

July

12-16 National housewares and home appliance exhibits, Auditorium, Atlantic City, N. J.

19-23 Western summer radio-television and appliance market, Western Merchandise Mart, San Francisco.

September

8-10 Pacific Coast Gas Association, Vancouver and Georgia Hotels, Vancouver, British Columbia.

8-10 Mid-West gas school and conference, Iowa State College, Ames, Iowa.

28-29 Texas Mid-Continent Oil and Gas Association, Baker Hotel, Dallas.

October

11-14 AGA annual convention, Atlantic City, N. J.

18-22 National Safety Council, Chicago.

November

1-5 National Metal Exposition, Chicago.

8-11 American Petroleum Institute, Conrad Hilton Hotel, Chicago.

17-19 Wisconsin Utilities Association, gas and electric sections convention, Schroeder Hotel, Milwaukee, Wis.

28-December 3 The American Society of Mechanical Engineers, Statler Hotel, New York.

February, 1955

7-11 Western winter radio-television and appliance market, Western Merchandise Mart, San Francisco.

April, 1955

12-14 AGA sales conference on Industrial and commercial gas, Hotel Statler, Boston, Mass.

25-27 Mid-West regional gas sales conference, Edgewater Beach Hotel, Chicago.

May, 1955

9-13 National restaurant exposition, Navy Pier, Chicago.

16-18 Southern Gas Association, New Orleans, La.

23-25 GAMA annual meeting, Ambassador Hotel, Los Angeles.

June, 1955

5-9 Canadian Gas Association, annual meeting, General Brock Hotel, Niagara Falls, Ontario, Canada.

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